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THE developments of recent years have lead the majority of railway managers to believe that most or all of the increases in net earnings which railways can hope to enjoy in future must be produced by reductions in the expenses of operation. In looking about they are finding many places where, by increases in the amount and in the efficiency of the supervision exercised over the various branches of operation, numerous and substantial economies can be effected without detriment to service. We begin this week the publication of a series of articles entitled "Opportunities for Economies on American Railways," by L. C. Fritch, which, it is believed, will be of very general interest. The articles will not be published each week, but at the rate of about one per month, and each of them will deal with a different "opportunity" of the kind mentioned in the general title. While most of Mr. Fritch's railway career has been in the engineering department, he has had a wide experience, having been division superintendent, assistant to the general manager and assistant to the president, and having done a variety of work along efficiency lines. It is to be hoped that his articles will draw out others from railway men, whether they agree or disagree with his views. There cannot be too much frank and intelligent discussion of the means for increasing economy and efficiency in the operation of American railways.

THE first ruling of the new public utilities commission of Connecticut is on the question of the reduction of fare from 15 to 10 cents on the trolley line from Hartford to Manchester, about 10 miles. The ruling calls for official information relating to the business of the line and original and secondary financing—these as a basis for the determination of a just fare. The Hartford and Manchester line is one of some twenty or more constituent properties now merged in the Connecticut Company—controlled by the New Haven—and which holds about nine-tenths of all the street railway properties in Connecticut. Since the consolidation the larger corporation has gone under general management and has been refinanced with total issues of debentures alone amounting to some $14,000,000. In determining the fare, after it gets the figures, the commission will have before it some puzzling problems and of a character reaching far beyond the special case. Is the Manchester line to be segregated, original cost determined and the fare adjusted on a basis of that cost or replacement values? Or, on the other hand, is the property to be treated as part of the Connecticut corporation's system, and carry its share of the cost of general management and of the fixed charge on the general debt? Again, is the fixing of fare to be based on the high charge of cross-country lines, or the low charge of the intensive business of the cities, or the general average per mile of both on some 700 miles operated by the Connecticut Company? If the Manchester line is to be treated as a separate unit by the commission it means the application of the same rule to other component parts of the system, the purview of original stock-watering long before the independent street railway companies were consolidated, and a local application of the "unscrambling of the egg" to Connecticut street railway fares. The final decision of the commission will be suggestive and of considerable scope as affecting the interests of a steam railway corporation controlling 1,300 miles of street railways in three states.

ON the face of it, there seems to be something wrong with an accounting rule which would permit a railway company to reduce the grades on a certain part of its line to 0.5 per cent. at a cost of $1,230,000, and charge this amount to capital account, but which would not permit the company to relocate its line to obtain a 0.5 per cent. grade at a cost of $630,000, and charge this much smaller sum to capital. The Kansas City Southern has brought suit against the Interstate Commerce Commission in the Commerce Court to obtain a ruling on such a case. The company has a mortgage which provides that bonds can be delivered by the trustee only to pay for capital expenditures. The practical effect, therefore, of refusing to permit the company to charge certain expenditures to capital account amounts apparently to a prohibition of the sale of securities by the company. The company had Horace Burt make a report on the best method of obtaining a line with 0.5 per cent. grades between certain points. He reported that if the present right of way were used and the grade reduction work done on this, it would cost $1,230,000, but that if the company abandoned its old line and built a new line, it could obtain the same results at a cost of about $630,000. The Interstate Commerce Commission's accounting rules pro-

vide that work done to reduce grades on an existing line may be charged to capital account as additions and betterments. On the other hand, the rules provide that if a property is abandoned, the cost of replacing it, less salvage, must be charged to operating expenses. Even as a piece of accounting theory it seems as if replacement value of abandoned property might better be charged to profit and loss than to income account, and the proof that the theory of charging it to expenses is wrong is in the fact that in practice, as illustrated by the Kansas City Southern case, it becomes a *reductio ad absurdum.*

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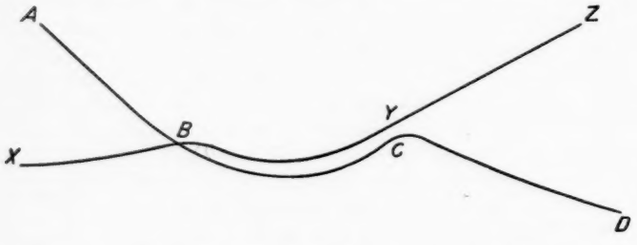
THE block system is so immeasurably superior to the time-interval system for protecting trains against rear collisions, that it pays to use it even when, because of lack of money, it is necessary to suspend the space interval very frequently. For this reason it is used on many lines where stations are long distances apart and permissive signals have to be given to freight trains every day, the absolute block system being maintained invariably only where a passenger train is involved. But by demanding too much of permissive signaling many superintendents have got into trouble. Permissive signaling, carried out according to the rule—which is that the following train shall be wholly responsible for not running into the leading train, never expecting a flag or torpedo—is safer than the time interval; but mixing the permissive system and the time interval system is liable to confuse the trainmen to such an extent that it would be better to use one system alone, even if it were the poorer one of the two. To forget this is pretty sure to cause trouble. Again, there are situations where neither permissive signaling nor the time interval can be made satisfactory without reducing speed or lengthening time intervals to an absurd degree. One of these is illustrated in the drawing below. This shows the arrangement of tracks where a rear collision happened recently not a thousand miles from Chicago. A freight train running from A to B, C and D was unexpectedly stopped near C. A following freight, which received a permissive signal at A, ran into the standing train, and two men were killed. The main trouble was that dependence was placed on the flagman of the leading train, though there would have been difficulty under simple permissive blocking. It was night, and the flagman and the following engineman both attributed their errors to the presence of a long freight train on the line X, B, Y, Z. They got its lights mixed with those of their own road. The flagman kept watch of the X Z train's head light, assuming it to be on his own road, and thought he was estimating its speed so as to properly protect his own train. The engineman, making a similar assumption, followed the X Z tail lights, the curvature of both lines being such that the foremost A D train was hidden. There is, of course, no excuse for either man, if he knew the road; and if either was ignorant of the road a responsibility rests with the trainmaster. But we are not considering this feature of the case; neither do we discuss the truthfulness of the explanations which were given. The one point to be noted is that where trains are run at night in the same direction on adjacent tracks around curves (as is the case at innumerable places on all four-track roads), the only safe way to make reasonable speed is to eliminate all dependence on headlights, tail-lights and flagmen; that is, have the absolute block system for all trains.




## THE LEAKAGE OF GRAIN FROM BOX CARS.

THE general freight agent of a prominent western railway said recently, "Nothing will do so much to improve the morals and integrity of the grain trade in respect to weighing as a grain tight box car." The element of uncertainty as to weight is a strong incentive for the unscrupulous grain seller to overstate the weight of his shipment and of the buyer to understate it. Large expense is now incurred by railways on account of grain shortage claims. If box cars could be made tight enough to prevent grain leakage, this expense could be avoided. The money loss to the carriers due to grain leakage can be gaged by the fact that five of the granger lines, owning about 150,000 box cars, paid out in one year more than $500,000 on account of claims for loss of bulk grain in transit.

At the June meeting of the Car Foremen's Association of Chicago, A. Schuyler, assistant weighmaster of the Chicago Board of Trade, presented data relating to grain car leakage, covering a period of six years, with some suggestions as to the cause and remedy. This information, together with that brought out in the discussion by the car foremen, has considerable value in its bearing on the construction and repair of the superstructure of box cars. It was found from the examination of 164 cars at one Chicago elevator that 9 per cent. lost grain on account of loose and defective sheathing, and 7.3 per cent. on account of defective doors and end posts. Two cars leaked at the end door and three at the grain doors. The percentage of leaky cars in the lot was over 20. This is larger than the average shown by the Chicago Board of Trade records which disclose that for the past six years 10 to 17 per cent. of all loaded grain cars weighed in the Chicago district had leakage defects; that 66 to 73 per cent. of all leaks were due to loose and defective sheathing; and that 14 to 28 per cent. were due to weak, defective and improperly installed grain doors, while 8 to 14 per cent. of the leakage was due to spills over the temporary grain doors. The leakage due to grain doors has been growing less in this period of six years, while that due to defective sheathing and lining has increased, and it is this latter part of box car construction which should receive proper investigation and improvements.

The flooring of wooden box cars is generally 1¾-in. tongued and grooved pine, and is nailed to the wooden sills and sawed off flush with the side sill. The posts and braces, 2½ in. to 3 in. wide, are also placed flush with the outer face of the side sill. The soft pine sheathing, with boards placed vertically, is nailed to the side sill and plate and to furring strips between the posts and braces. The inside lining boards, tongued and grooved, are laid horizontally and nailed to the same furring strips. This makes a cellular structure with posts and braces between the two walls. On the cars of some railways the lining is continuous from top to floor, making a closed cell; on many other cars there is a longitudinal opening 2 in. high at the middle belt rail and at the floor; these are intended to allow grain which gets between the lining and the sheathing to flow out when the car is emptied. There is disagreement among car builders as to the importance or value of these openings and as to the two methods of constructing the walls of box cars. The open lining is of some use for the purpose stated, and it prevents to some extent the accumulation of materials which would make the car foul and objectionable. It also permits of inspection at the floor line to detect leakage from loose sheathing. The advocates of the closed lining say that it can be easily inspected and if kept tight and in proper repair it matters little whether the sheathing is bulged, loose or defective, as leakage cannot extend to it. Defects in the sheathing cannot be so easily detected, and it is only after loading begins that they are discovered, and then repairs are difficult.

The principle of closed lining is correct, not only for the reason stated, but on account of the effect of pressure due to the weight of grain. This pressure on the lining is resisted by the posts and braces, but with the sheathing it is only held by nails

in soft and often rotten wood. This is principally true of the old wooden cars whose side sills are soft from decay, or whose sheathing is split from frequent nailing. New wooden cars will suffer from decay in a much shorter time than the older cars which were built of sills comparatively free from sap and with sheathing of almost all clear white pine. In the design of new box cars with steel underframes this leakage of grain from the defects noted does not seem to have had proper consideration. The sheathing is usually held in place by a nailing strip spiked to the floor, making a very insecure fastening. Such construction is fit only for rough freight, and after a short service it is necessary to nail boards on the outside to keep the grain in.

New cars leak on account of short flooring boards or defective ends. They are often built of unseasoned hard pine and with irregularly sized flooring and siding, and after a hot summer the shrinkage of this lumber develops cracks which permit bulk grain to leak.

There should be a more rigid classification of box cars, and only those which are tight and in good condition should be marked good for the elevators. Others which may leak can be marked good for merchandise; and others, not so good, for rough freight. Cars with weak doors and end posts should not be selected for grain. The use of the temporary grain door is now general, and the door posts soon become filled with nails and spikes so that they are injured and weakened, and it is difficult properly to fit temporary grain doors to them. These defects in sheathing and lining have led to the use of burlap or paper coverings, and of oakum calking. The practice is so general that "cooperage" is now a common term as applied to this class of car repairs.

It has been suggested that a closed lining sheet metal angle be nailed to the car floor with the upper edge driven into a groove in the bottom lining board; also that a metal angle be fastened over the top belt rail from a groove in the top lining board to prevent grain from entering the cell between the sheathing and lining. The paper and burlap coverings are not effective if the upper belt rail is not tight, and there are records of cars so "coopered," which have traveled only a few miles between loading and unloading elevators and have shown a loss of over 300 lbs. of grain. When linings leak the grain is often allowed to remain in the pockets; when these are cleaned out the grain often weighs as much as 250 lbs. per car, and averages 80 to 120 lbs. When this grain is allowed to remain behind the lining after the car leaves the elevator, it is an incentive to car sweeping vandals to damage and mutilate box cars so that the conditions necessary for their harvest will be maintained.

The Rock Island Lines have recently issued special instructions covering the inspection and repair of box cars for bulk grain loading, and these require the use of wide strips of burlap over the grain doors, at the car ends, and for patching defective floors and lining. All these expensive methods of making box cars secure against the leakage of grain should be more seriously considered in the design and specifications for new box cars, for the present remedies and those usually suggested must be regarded as temporary makeshifts which should not be necessary in a proper permanent construction. The ideal grain car secure against leakage would be a steel tank car 9 ft. in diameter, somewhat similar to those now built for the oil traffic. The obvious objection to such a car is that even in the grain districts box cars are only loaded with wheat six or eight times a year at most, so that a special grain car cannot be considered. The all-steel box car has been used by the Union Pacific, and it must be free from leakage if the grain doors are made tight. The same road has some box cars with corrugated steel ends, which are tight to that extent. The Canadian Pacific has 3,000 box cars with steel underframes and steel posts and braces. The sheathing is 1½ in. x 5 in. pine laid horizontally, and is bolted to the steel frame with provision for any adjustment required by shrinkage. This car was illustrated in the *Railway Age Gazette*, March 10, 1911, page 455. The Erie also has in service box cars of this type. In this design the objectionable cellular construction is avoided, and there is good opportunity to inspect for leakage on the inside or outside, and the sheathing boards are bolted and not nailed. There should be little difficulty in keeping this type of car secure against grain leakage.

Most railways will prefer for the present to use the usual vertical board sheathing and wooden posts, but they will order steel underframes in increasing numbers. This type of box car should receive some improvement over present designs to prevent grain leakage. It is suggested that a steel sheet at least 1/16 in. thick and 1 ft. high, flanged with a short angle at the bottom, be placed around the bottom of the car and be riveted to the steel side sill. The siding could be bolted to this by the use of a steel band on the outside of the sheathing, and nailing at the bottom could be dispensed with. This should prevent bulged and loose sheathing and leakage at the corners. While this exact construction may not be the best for the purpose, it will serve to illustrate the principle which should be observed in the design of box cars with steel underframes and wooden superstructure.

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## SOME REMARKS ON CO-OPERATION BETWEEN INDUSTRIAL CONCERNS AND RAILWAYS.

THERE was much talk about co-operation between the railways and the shippers in the year following the passage of the Hepburn act. The National Industrial Traffic League, composed of traffic representatives of large industrial concerns and commercial associations, was formed largely to bring this about. One of its principles was that differences about rates should be settled oftener by conference and agreement and less frequently by appeals to commissions and courts. Since the League's organization there have been more appeals to commissions and courts and more long and bitter struggles between railways and shippers than before. But it is undiscouraged. It gave a dinner in Chicago on November 16 to which prominent railway officers were invited; and the keynote of all the speeches was "co-operation."

More real co-operation between the railways and industrial and commercial concerns is most desirable. Many problems could thereby be amicably and speedily solved, whose solution is now relegated to the slow, expensive and unsatisfactory processes of litigation. That there is not more of this sort of co-operation is largely the fault of railway men. They are too much inclined to herd by themselves. If more of them, and especially more of the higher traffic and operating officers, made it a practice to belong to and attend regularly the meetings of their local commercial organizations, to serve diligently on their committees when invited, and constantly to participate there and elsewhere in discussions of large transportation, industrial and commercial problems, the relations between the roads and the commercial and industrial interests would be better improved, to their mutual advantage.

But many persons connected with large industrials, including not a few members of the National Industrial League, have fallen woefully short of living up to the principle of co-operation, which is the object of so much laudation at public dinners, but which elsewhere has thus far been more honored in the breach than in the observance. There can be no real, beneficial co-operation between industrial concerns and railways which does not consist in active efforts by both to promote the interests and protect the rights of each. The tendency of the anti-pooling provision of the Interstate Commerce act and of the Sherman anti-trust act is to compel the railways to compete recklessly, and, in consequence, to discriminate unfairly. Every intelligent industrial traffic manager in the United States always has known this. Have they shown the spirit of co-operation by helping the railways in their efforts to get these unreasonable provisions modified? The National Industrial Traffic League has favored an

amendment to the Sherman law as it applies to railways, but it did not advocate it with the same energy or effect that it did legislation to give the Interstate Commerce Commission more power over rates. Certain shippers incited action under the Sherman law against the railways when the roads took concerted action to advance their rates; and some of the members of the Industrial Traffic League participated in this move.

It is notable that the attitude of shippers toward the Sherman anti-trust law has perceptibly changed recently. It has become anathema to many of them because while it seemed to them a good law to set in operation against the railways, they consider it a bad law when put in operation against industrial trusts. The western roads that combined to raise rates did not control anywhere near as large a part of the railway business of the United States as certain of the large combinations control of the business in their lines; and the Interstate Commerce Commission had power if unreasonable rates were made to reduce them. But, while the federal government received the applause of shippers for starting the prosecution at Hannibal, Mo., it evokes loud complaints from them by enforcing the Sherman law against the Standard Oil Company and the American Tobacco Company and setting it in motion against the United States Steel Corporation and the International Harvester Company. Perhaps it is only human to admire the big stick more when used for one's apparent advantage, to break a more or less offending neighbor's head, than when laid on one's own pate.

The agitation against railways in which large shippers have so cheerfully and noisily participated is one of the main causes of the present attitude of public sentiment toward both railways and large industrial corporations. They succeeded in convincing the public that the management of railways was bad; but the public, contrary to their intentions and expectations, has included in its condemnation all large corporations. The industrials being now in the same, or a much worse plight, as the railways, the reasons and the opportunities for some real co-operation between them for large purposes seem improved. One of the worst features of the railway business today is the continuance of unfair discriminations in rates for the express benefit of some of these large concerns whose traffic managers belong to the National Industrial Traffic League. Real, far-sighted co-operation would see that their continuance is against public policy, is morally wrong, and will, in the long run, get both parties to it in very serious trouble, and would bring about their elimination. Are the shippers of packinghouse products and copper, for example, prepared to show their spirit of co-operation to the extent of agreeing with the railways to advance the rates on these commodities to a reasonable basis? Are the large industrials owning small railways which are in the enjoyment of per diem reclaim arrangements which result in their receiving what are morally, if not legally, rebates, ready to show their spirit of co-operation by agreeing to the abolition of these arrangements? Or, are shippers in favor only of the sort of co-operation which benefits them, and costs them nothing?

Again, is the spirit of co-operation between the railways and shippers such that they can take concerted action for measures amending the Sherman act so as to make it reasonable as applied to both industrial concerns and railways? The case for amendment of that law was admirably and powerfully stated by former President Roosevelt in *The Outlook*. The destruction by a series of lawsuits of large industrial combinations will not destroy the worst existing abuses in modern industry; it will not restore reasonable competition; and it will very largely destroy the efficiency in business management which can be gained through large combinations. The dissolution of the splendid organization built up by the Standard Oil Company will not reduce the price of oil; it will increase the cost of production and distribution, and, therefore, very likely will increase the price.

The great need, as Mr. Roosevelt points out, is not the demolition of large combinations, but proper administrative control of them to prevent abuse of their power; and if, as the ex-president says, it is the height of folly to continue to leave in effect and enforce the Sherman act as to industrial combinations, how much more unwise and unjust is it to leave it in effect and enforce it as to railways, which already have been subjected to more administrative control than he advocates for industrial corporations.

The situation of the railways was illustrated by a remark made by a very prominent industrial traffic manager at the meeting of the National Industrial Traffic League. Some question being raised as to certain changes in classification in Southern territory, H. C. Barlow of Chicago described the Sherman anti-trust act "as a lasso with which to curb the railway freight classification committees when they get too frisky." "Under the Sherman anti-trust law," he said, "the Southern Classification Committee cannot meet again if you don't want it to. I mean if you want to go that far." It is known to every man who knows anything at all about railway traffic that the existence of the various railway traffic committees is absolutely indispensable to the satisfactory handling of classification and rate matters. Under modern conditions the business dealings of the railways with each other and of shippers with the railways would be reduced to anarchy if these bodies did not exist. The railways under existing law cannot either individually, or by concert, put into effect a single change in interstate rates or classifications that will increase the cost of transportation to the shipper which is not subject first to review by the Interstate Commerce Commission. And yet Mr. Barlow implies that the classification and rate committees are in violation of the Sherman law, and exist only because it is not strictly enforced. It is doubtful if the view expressed by him is entirely accurate, but the fact that there can be any doubt at all as to the legality of even the most reasonable concerted action by railways is an overwhelming argument in favor of the amendment of the vicious law which causes that doubt.

No one can blame the administration for enforcing the Sherman law. It is its duty to institute proceedings against every combination, railway or industrial, which it believed exists in violation of it. And it is to be hoped that it will unreservedly and impartially perform that duty; for experience indicates that nothing short of its enforcement against all the classes of combinations to which it applies will ever bring about its appeal or reasonable modification. That it is the administration's determination to do this President Taft has most emphatically declared. Fronted by this menace to the economic welfare of every business, and, indeed, of every person in the United States, it would seem that the shippers, the railways, the labor unions, and all other interests should by co-operative action endeavor to secure reasonable legislation for the modification of the Sherman law. That would be a form of co-operation which would be worth while.

However, before any such movement is started, the leaders of industry had best recognize and face the fact that it is a necessary condition precedent to the reasonable modification of the Sherman law that industrial concerns shall submit to some such administrative regulation as has been extended over railways. Their spokesmen have often said that the railway is a public service corporation, while such concerns as the International Harvester Company and the United States Steel Corporation are engaged in private business. The more intelligent public opinion of the country now recognizes the fact that, while the law may say this, economically the distinction has, by the growth of many industrial concerns to enormous proportions, been largely obliterated, and that the public interest as surely requires strict supervision and regulation of them as of railways. If the leaders of industry are unaware of this, and are not prepared to submit to effective public regulation, they had just as well yield themselves up to the rigors of the Sherman law; for in the present state of public opinion—a public opinion their own anti-railway agitation has helped produce—they have got to submit to either such judicial regulation as they are now receiving or to administrative regulation similar to that to which the railways are subjected.

# Letters to the Editor.

## HANDLING CONSTRUCTION WORK WITH DIVISION FORCES.

Pocatello, Idaho, Nov. 6, 1911.

To the Editor of the Railway Age Gazette:

As a division superintendent who spent a number of years as a locating and construction engineer, and has twice had the opportunity of moving from the position of superintendent of construction to that of division superintendent of divisions, portions of which each time consisted of the line which I had built, I find letter No. XIX From an Old Railroad Official to His Son, a General Manager, in the issue of October 6, most interesting.

The division organization which will take care of the construction of second track, terminals, and work which must of its very nature be in a measure handled by the forces, trains and equipment of an operated line, is to be desired. The division engineer with the co-ordination of other division officials can most successfully conduct this work. He is acquainted with the resources of the division. As to terminals, although plans have been very carefully made and approved by operating officials, many details constantly arise in which slight changes are necessary to make a yard or shop plant desirable from the viewpoint of economical or convenient operation. These features may be brought to the attention of the division officials as the work progresses, and if desirable, a cabinet meeting can be called and the matter quickly decided upon. It has been said that the details of the building of the most extensive terminals in the world were largely a matter of development as the work progressed, and it is rare that an engineer reporting to a chief engineer at some distant point, perhaps, feels at liberty or has the self-assurance to make these minor changes without first consulting with his superior officer.

In the construction of a new line one of the problems before the engineer at the "front," who must be resourceful and self-reliant in meeting constantly changing conditions, is presented by the fact that at his isolated location he reports to a distant chief engineer, who cannot provide for him as quickly as sometimes is necessary; or, if he reports to an operating officer, it may be to one who has not had the particular experience to enable him to realize fully the needs of the construction engineer and his work. For instance, the division superintendent or his assistants may have a locomotive which has already made, or nearly made, the mileage required before it is entitled to an overhauling in the back shop, and it is frequently supposed that such a locomotive is plenty good enough for the work train requirements of the construction engineer, although it must be kept at a point distant from shop and roundhouse where light repairs may be kept up. This is a mistake, of course. The requests of this isolated construction engineer for equipment, material or supplies may frequently be given secondary consideration by division officials, because they must first look after their own work.

All of this naturally makes the aggressive young engineer fight for his own, and it is a struggle for self-preservation rather than a desire "to put one over on the so-called operating men" as expressed in the letter. By all means, the man who has had experience in conducting transportation and in the maintenance department should be the best man to handle the construction job if he has had the opportunity to also gain construction experience, for he should know then for what he is building.

There are three points, however, which I would like to bring out in connection with the subject. They are these:

First, when it is decided to build the new line, and the cabinet meeting of all the assistants is called, and the work turned over to the division engineer, it must be understood right then and there that in order successfully and economically to handle the construction of the new line, unless it be very short and the work light, the engineer who is to have direct supervision, must, by all means, move bag and baggage to the "front." A few years ago, the chief engineer of the Northern Pacific in a little book of instruction to its locating engineers, emphasized the fact that a locating engineer could not direct his work from behind the transit. No more can a construction engineer direct his work from an office.

Second, it is absolutely essential that successfully to prosecute construction work there must be a separate and complete organization at the "front." The trainmaster of a division has not the time to so direct the movement of work trains on construction as to handle successfully the movement of gangs of laborers, of material for contractors, for track layers, and for bridgemen. It by no means follows that a good conductor on a freight train will be a successful work train conductor, who can and will look after the handling of his train in such a manner as to cause the least possible delay to gangs of workmen. The despatcher of an ordinary division has not the time to handle the work trains on a construction job. The engineer should have in his office at the front, a wire, the telegraph line having beep kept up, and one of his office force should be a capable operator or train despatcher who is able to do such despatching as may be necessary when two or more trains are employed. Such a job requires a well arranged material yard, and a certain amount of supplies, tools, etc., to carry on the work day by day without calling upon the general store for emergency supplies or tools. Provision must be made for taking care of the locomotives to a certain extent. The engineer who depends on sending his work train locomotive to a terminal shop one hundred miles or more distant for wash-out, light repairs, etc., will find that he has sacrificed the opportunity for doing small jobs in the odd moments, on Sundays or rainy days, which at the end of the month make for satisfactory progress. On construction work perhaps more than anywhere else, it is looking after the little things, the details which save fifteen minutes here and fifteen minutes there to a hundred men or more, which tells. The big things take care of themselves. There is no routine work, and the success of the construction engineer is spelled by looking after these details, insofar as to see that they are done. He must provide a small, well equipped blacksmith shop, perhaps on a car. He must provide necessary tools, pumps, fittings, etc., for improvising temporary water stations. He must also see that his boarding outfits are properly handled. Numerous other details need not be mentioned.

Third, the construction engineer's office should be equipped with sufficient force to enable him to keep proper record of the forces employed, and the amount of material expended in such a way as to enable him at stated periods thoroughly to analyze the cost of his work as it progresses. This does not mean any interference with the duties of the division accountant, if he is to look after the final accounting for the work, but simply that time keepers, material clerks, estimate clerks, etc., shall be aides to the division accountant, although not directly reporting to him.

W. R. ARMSTRONG,
Superintendent, Montana Division, Oregon Short Line.

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The Canton-Hongkong Railway is now in full operation for passenger and freight service. It was formally opened on October 4. The first, or British section was constructed from Hongkong to Sam Chun, about 22 miles, and opened about a year ago. The second section was constructed by the Chinese government, with the money loaned by the colonial government of Hongkong, and extends 89 miles from the British border at Sam Chun to Canton. The British section tunneled through many mountains, and cost $5,164,710, while the Chinese section traversing level ground and having two main bridges, cost $6,510,000. Two through express trains are run in each direction daily between Canton and Hongkong. Nearly all the freight cars and passenger cars were made in China.

## IMPROVING RAILWAY TERMINALS AT SEATTLE.

BY H. COLE ESTEP.

After an investigation extending over eighteen months and at a cost of nearly $50,000, the Municipal Plans Commission of the city of Seattle has submitted its report. The commission was empowered by law "to procure plans for the arrangement of the city with a view to such expansion as may meet future demands." The idea was to draw up a scheme for the physical development of the city which should be at once comprehensive and harmonious. In addition to many other problems, the commission devoted a large portion of its energies to a study of the steam railway terminals at Seattle and has recommended radical changes in the existing facilities.

The changes suggested include a rearrangement of the tracks along the waterfront on Railroad avenue for a distance of five miles, the construction of a sea wall and the filling of three miles of the present pile trestle on the Great Northern right of way, extensive track elevation on the tide flats at the southern end of the city to cost about $9,000,000, and finally the erection of a large new union passenger station at the south end of Lake Union, together with a tunnel under the main portion of the city to connect with the existing stations on King street.

As will be seen by references to Figs. 2 and 3, Railroad avenue, with its southerly extension, Whatcom avenue, follows the line of Seattle's waterfront on Elliott Bay from Smith's Cove to Spokane street, a distance of five miles. It is really a strip of railway right of way rather than a street, for it affords an important connection between the railways entering Seattle on the north and those entering on the south. The avenue is encumbered with tracks practically its entire length and between Yesler Way and Pike street it traverses the busiest section of the waterfront. To the west are the piers for passenger and freight steamers, docks, warehouses and some commercial houses; on the east lies the principal commercial and business district of the town. Both sides of the avenue must, therefore, have adequate facilities for handling freight. Between Yesler Way and Holgate street, the south end of the avenue, the territory through which it runs is occupied by wholesale houses and manufacturing plants, while south of Holgate street, Whatcom avenue runs over tide flat lands at present almost entirely given over to switch yards and manufacturing establishments. The present problem is to separate the heavy railroad and street traffic on this thoroughfare.

The width of Railroad avenue proper varies from 120 ft. to 180 ft. The railways have franchises which if used to their limit would occupy practically the whole street except a narrow margin along its west side, which is frequently crossed by the curved tracks leading to the piers. Between King and Pike streets there are now eight tracks, laid on 15-ft. centers, the center line of the most easterly one being also the boundary line of Northern Pacific property on the east side of the avenue from Yesler Way to Pike street.

By virtue of its location along the bay, all traffic to and from the waterfront must cross Railroad avenue, and as it is a water-level street a great portion of the north and south through street traffic also seeks this avenue to avoid the adverse grades that so complicate any transportation problem in Seattle. A state of congestion results that is a serious annoyance to everyone concerned. Between King street and Bell street the railways are prohibited by ordinance, between the hours of 7 a. m. and 9 p. m., from using their tracks for any other purpose than switching, and between Main and Union streets, where most of the passenger steamer docks are located, they are prohibited to move any cars or trains between the hours of 7:30 and 10:30 a. m., and 4:30 and 9 p. m.

To relieve both the railways and the public of the delays and dangers incident to the present congested condition, the Commission recommends that Railroad avenue be brought to a width of not less than 180 ft. at all points; that a sea wall be built along the west side of the avenue from Madison street to Smith's Cove and the avenue filled and paved its entire length from Smith's Cove to Holgate street; also that Whatcom avenue be fully improved from Holgate street to Spokane street.

It is estimated that 2,500,000 cu. yds. will be required to fill the avenue north of Madison street, along the line now occupied by the Great Northern trestle. Unlike the territory south of Washington street, which is filled or partly filled from Railroad avenue out to the inner harbor line, the tide land to the north is so narrow that the proposed sea wall is located on the outer margin of Railroad avenue, widened where it is necessary. Fig. 2 shows the suggested location of the slips and piers which will

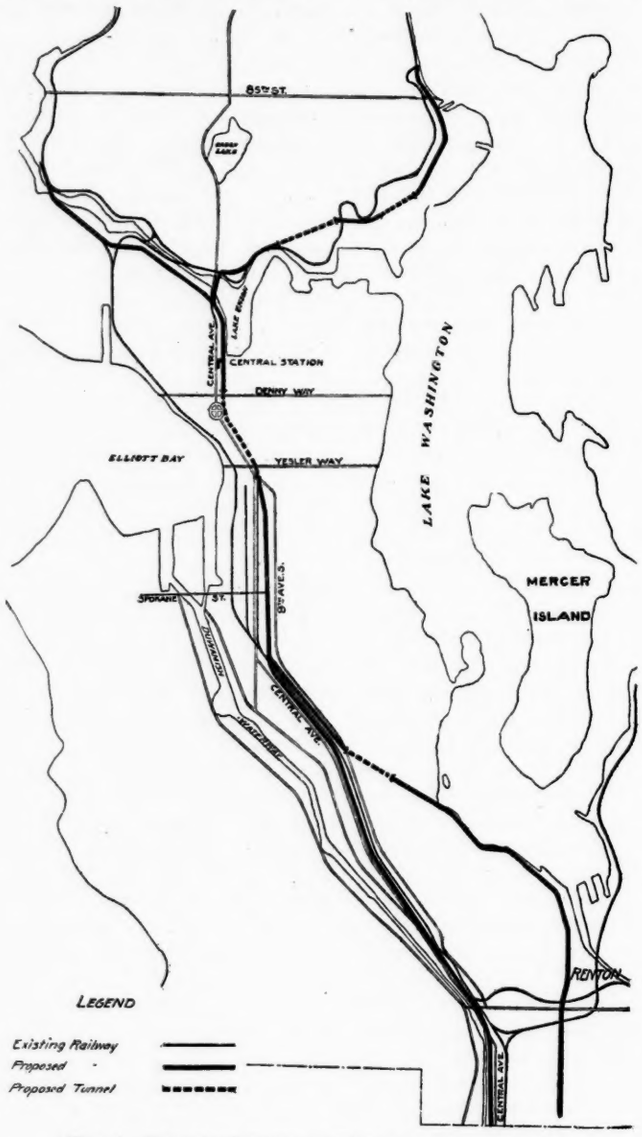



Fig. 1—Principal Railway Entrances Into Seattle.

be needed in this area in the future. It is recommended that the latter shall lie north and south, running parallel to each other and occupying all the space outward from Railroad avenue.

Only tentative designs are submitted at present for the sea wall; Fig. 5 shows one which the commission considers should prove satisfactory for a great part of the waterfront. It provides that broken rock of large size, free from dirt and small particles, shall be dumped in windrows, one above the other, forming the slope of the structure facing the bay. On the completion of the first windrow to a level 8 ft. or more in height, the area behind, that is, on the shore side, is to be filled

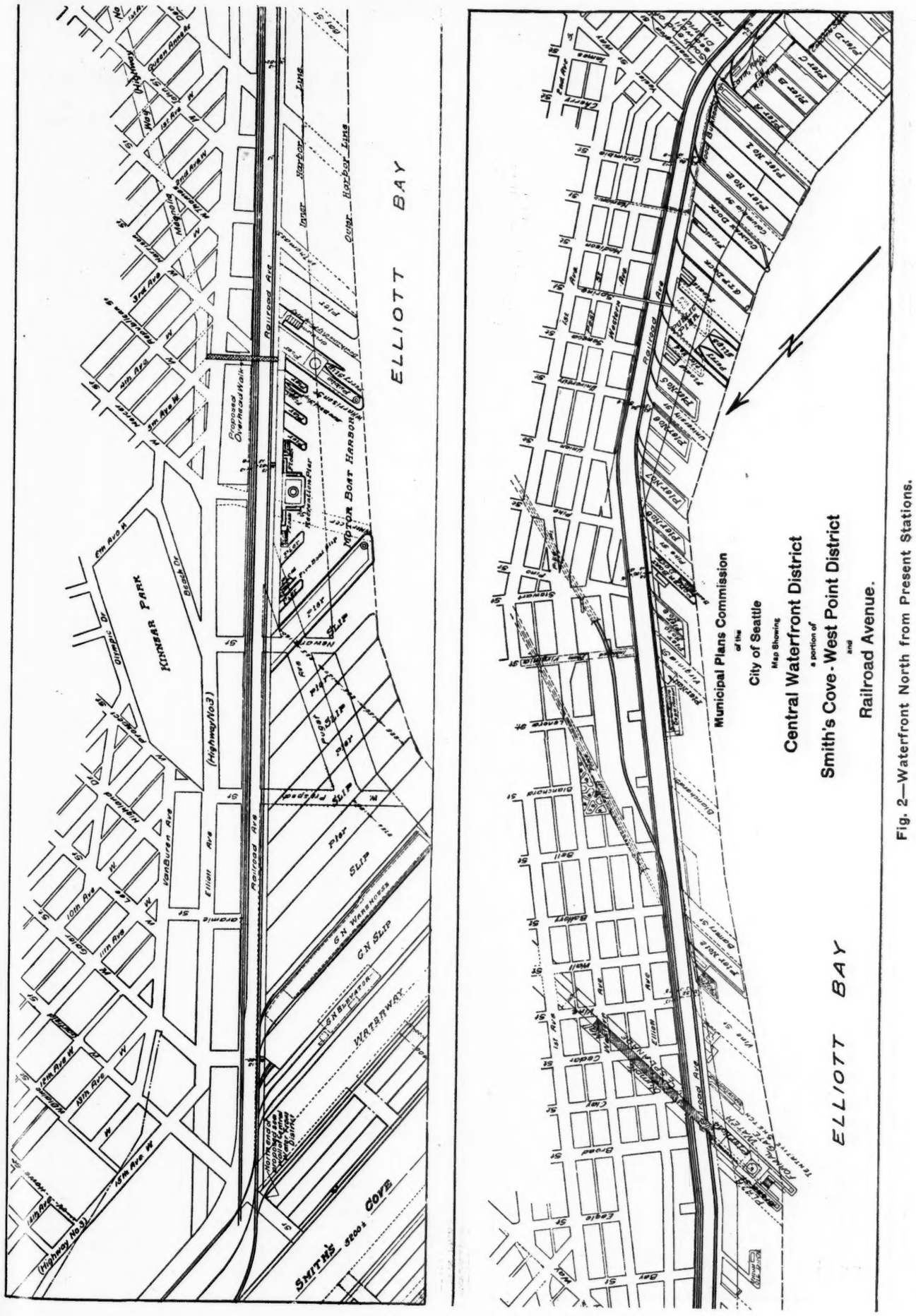



Fig. 2—Waterfront North from Present Stations.

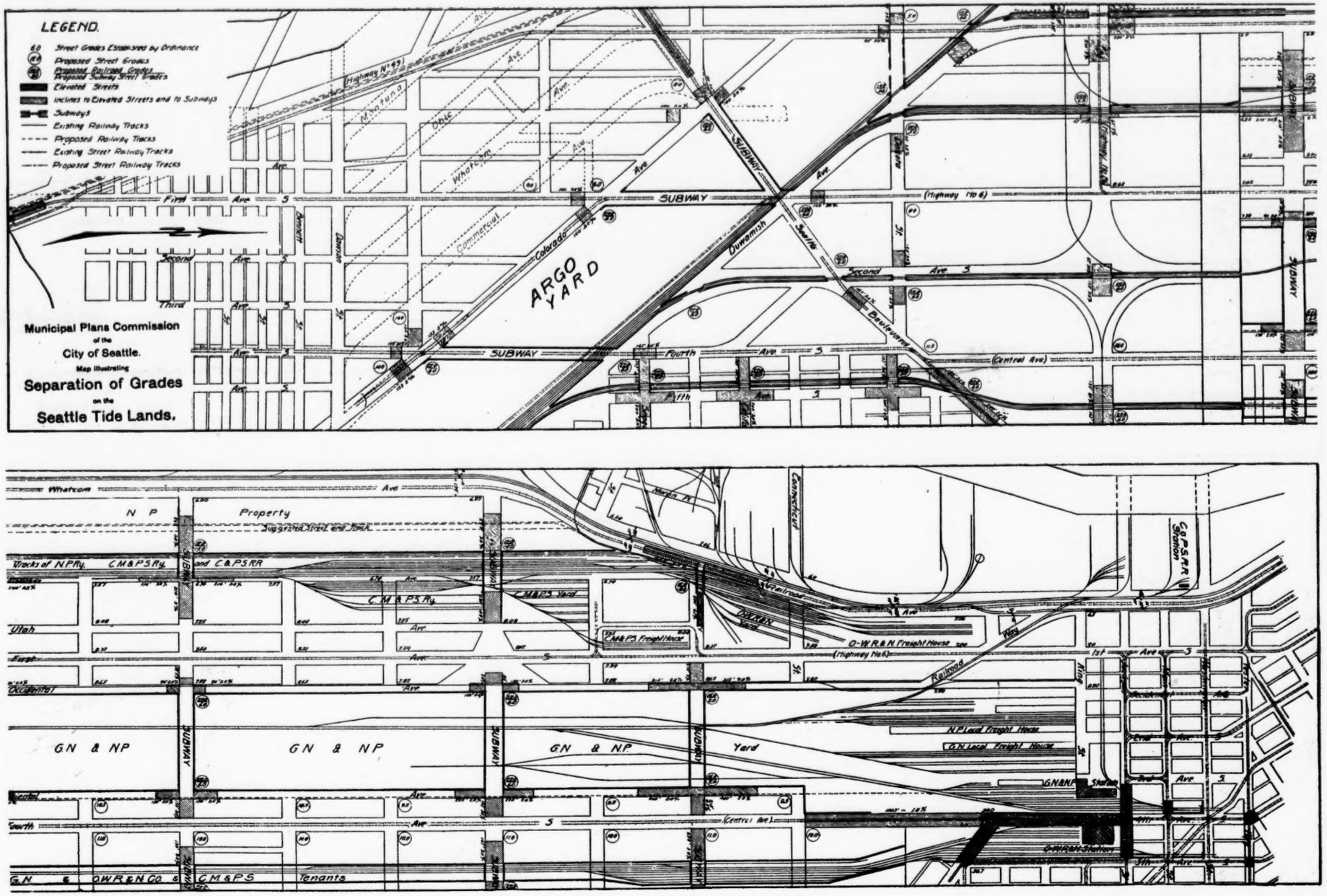



Fig. 3—Railway Yards South of Present Stations.

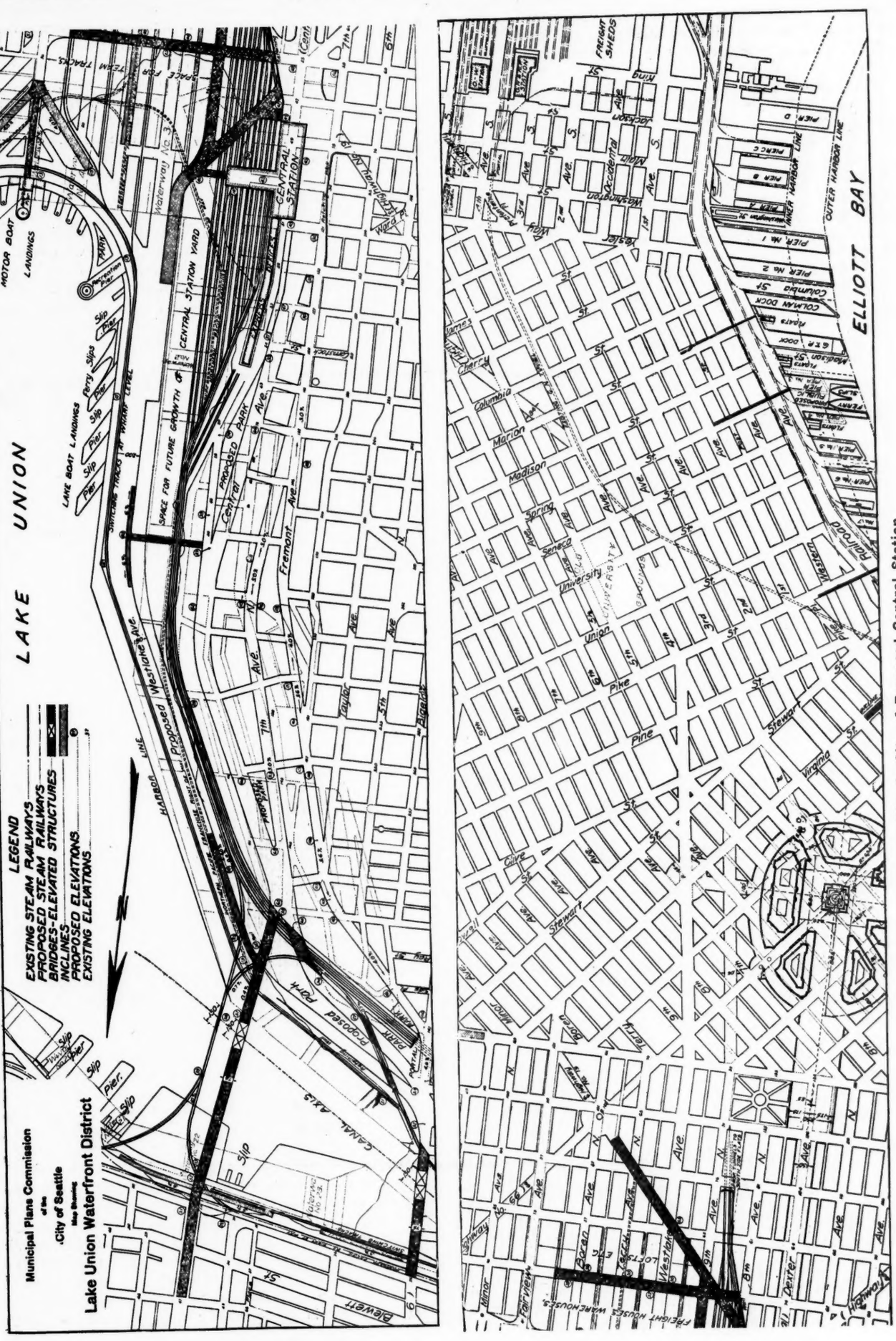



Fig. 4—Site of Proposed Central Station.

with sand or other suitable material. The next windrow is then to be built on top of the first, on a line with the slope, and filling made behind it until by a repetition of this process the work is carried to mean low water.

The face of the broken rock is expected to take a natural slope of 1¼ to 1, and after the filling is completed a slope wall about 3 ft. in thickness will be laid in cement mortar from mean low water to grade. This method insures stability, and the cement wall will afford a barricade against the destructive wharf rat. The cost of this design is estimated at from $75 to $100 per lineal foot, such cost to include riprap, masonry, slope wall, all filling, sidewalk and curb.

Various other plans for improving conditions in the congested district between King street and Smith's Cove were considered. The most apparently feasible of these, a project for the construction of an elevated street over the railway tracks the entire length of the avenue from Spokane street to Smith's Cove, was finally dismissed as prohibitively costly and the present comparatively inexpensive plan for widening the street and eliminating some tracks was adopted instead.

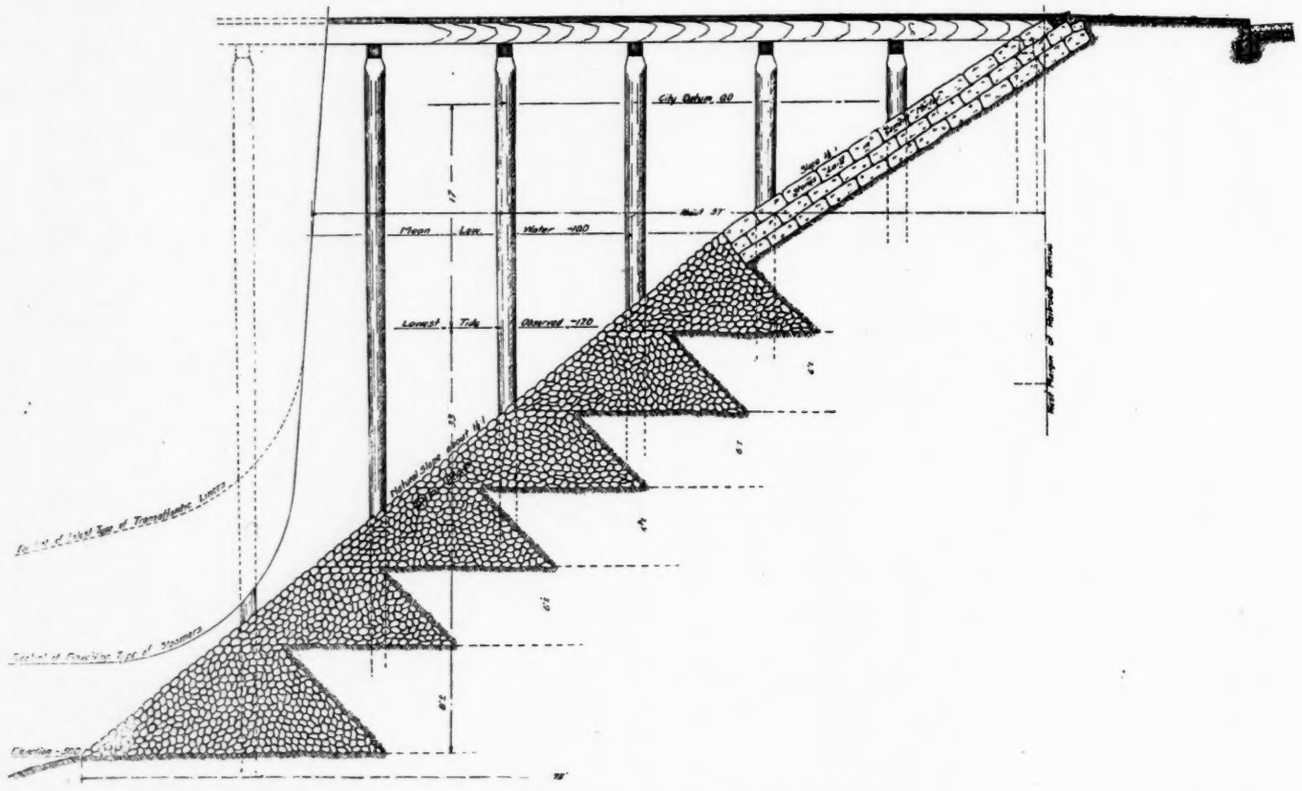


Fig. 5—Design of Proposed Sea Walls.

In connection with a plan once suggested for a temporary overhead street on Railroad avenue between Yesler Way and University street, it was understood that the railways were willing to remove two of their tracks from the avenue in order to provide room for inclined roadways from the overhead street to the level of the tracks and piers on the avenue. There seems to be no doubt of their willingness to give up two tracks and relay their remaining tracks 13-ft. centers instead of the present 15-ft. centers and also to shift the tracks serving the piers somewhat to the west, or to a line whence the curves would generally conform to a radius of 193.18 ft. They would also rearrange their tracks on Whatcom avenue as outlined in Fig. 3. The resulting gain in clear street space and the arrangement of the tracks remaining on Railroad and Whatcom avenues is shown in Figs. 2 and 3.

The rearrangement of the tracks will leave Whatcom and Railroad avenues practically free of tracks except for a few crossings, and it is expected that the plan thus outlined will meet the needs of the situation for many years to come. In the event that future development requires more clear space along these streets it is planned to elevate the tracks on the east side of Railroad avenue on a permanent structure that will permit of the movement of vehicles and pedestrians below it. The tracks on the west side, serving the piers, may have to be shifted further west, following the projected moving of the waterfront westward, but neither of these changes should be necessary for a number of years.

When surrendering portions of their rights of way on Railroad avenue and Railroad Way for the accommodation of street traffic, the commission recognizes that the railways will justly insist that new franchises for competing lines shall not be granted along the areas released, and the city, for its part, would expect to require that the tracks remaining on the avenue should be for the common use of all steam railways.

The second problem the commission takes up in connection with steam railways is the separation of grades on the tide flats at the south end of the city. The tract east of the East Waterway and north of Duwamish avenue, shown in Fig. 3, comprises about 1,450 acres, streets included, of which there are extensive areas outside of the railway properties that are available for future manufacturing developments and which will therefore require rail facilities for handling freight. The tracks, properties and franchises of the railway companies extend north and south through this tract, lying approximately parallel to each other.

A proposition to elevate certain streets and avenues in this district once was adopted and a condemnation ordinance passed by the city council. This was afterward repealed and it is now felt that such a solution of the problem of separating the grades would be unwise. The commission is unanimous in regarding track elevation with subways for such cross streets as are to remain open, as the only adequate solution of the problem, and it is stated that the engineering departments of the railways concerned concur in this opinion, although prior to the studies

made by the commission they had favored the elevation of the streets rather than of the tracks. Fig. 3 shows the improvements suggested, together with those few subways which the commission has felt could be definitely located now.

It is not intended that industrial tracks shall be elevated unless special circumstances render it desirable in individual instances, such as at the Colorado street yard of the Northern Pacific, where it is thought desirable to retain two such tracks along one side of the property. Generally speaking, industrial tracks are to be confined to alleys running north and south, although a single industrial track on the east side of Utah avenue is allowed, another on the west side of Occidental avenue and still another on the east side of Oriental avenue. Right of way for any additional tracks that might be needed along these avenues must be provided for by the property they serve or by future widening of the avenues. No franchises for industrial tracks crossing avenues between King street and Duwamish avenue are to be granted, unless the tracks are elevated at least at the crossings.

The plan provides for the elevation of the extensive Argo yard of the Oregon-Washington Railway and Navigation Company. South of this yard the running tracks are all close under the slope of the hill on the east side of the valley; they are not to be elevated, but are to be crossed, where it is necessary for street connections, by short overhead bridges.

Tentative estimates of the cost of elevating the tracks on the tide flats indicate that the ultimate expenditures by the railways will amount to eight or nine million dollars. In view of the financial depression and the preliminary work necessary before actual construction could be begun, the commission provides that the track elevation need not begin before September 15, 1913. The date of the completion of the work is left to the future.

In choosing the location for a future union passenger station at Seattle, the Municipal Plans Commission considered first the available approaches to the city. Just as topographical conditions led the existing railways to enter Seattle from either the north or the south, any new roads seeking entrance would have to follow practically the same routes. The desirable avenues of railway ingress and egress are three in number and are so located that they form a huge "Y," the branches of which, referring to Fig. 1, may be described as follows:

(1) Any line entering over the south tide flats, produced northward to Lake Union.

(2) The Northern Pacific route from the north, along the west side of Lake Union.

(3) The Great Northern route via Salmon Bay and the east side of Puget Sound.

At the intersection of these three lines on the southwest side of the Lake Union Basin the commission puts the site of the proposed central station, as shown in Fig. 4. The location chosen is at Roy street and Central avenue, the proposed axial highway of the city, thus making the station virtually a part of the civic center.

The station would be adjacent to the ferry and steamer landings planned for the southwest end of Lake Union and there would be space available for terminal facilities for all the railways, allowing for future growth. The three routes leading to the station have been planned so as to eliminate all grade crossings along the main lines through the city. Space would be available for coach storage and cleaning yards between the proposed new main line along the north side of Queen Anne hill and Lake Washington canal, from Fremont avenue to Fourteenth avenue west. The same location would afford space for a general yard to be used as a center of switching operations and for making up and breaking up freight trains.

Those roads which now have their freight depots, passenger coach and storage yard facilities on the south tide flats would not be expected to abandon them, nor their present passenger stations. These would be needed to accommodate the south end of the city and the yards near the proposed central station would be utilized by the railways entering from the north. The south tide flats would be connected by tunnel to the central station district, eliminating substantially all schedule trains from Railroad avenue.

The commission advocates a single terminal management, either private or municipal, on the basis that it would eliminate duplication of track and terminal facilities, release land valuable for industrial purposes, simplify and reduce the cost of operation, facilitate the prompt delivery of cars and make the port and city a terminal unit.

The foregoing is a brief outline of the suggested changes in the steam railway terminals at Seattle as recommended by the Municipal Plans Commission. The railways affected include the Northern Pacific, Great Northern, Oregon-Washington Railway & Navigation Co., and Chicago, Milwaukee & Puget Sound. The commission consisted of 24 members appointed by the various civic and commercial interests of the city, the appointments being confirmed by the mayor. Among other interests, the railways were represented on the commission. The work was under the supervision of Virgil G. Bogue, consulting engineer, New York. Mr. Bogue was chief engineer of the Western Pacific during its construction.

Regarding the execution of the plans suggested by the commission, an amendment to the city charter provides that the report of the commission shall be submitted to a vote of the people and that if it receives a favorable majority, "It shall be adopted and shall be the plan to be followed by all city officials in the growth, evolution and development of said city of Seattle." These legal formalities are now in process of execution and there is practically no doubt that the plan as outlined by the commission, including the suggestions regarding railway terminlas, will become a part of the organic law of the city.

## PROPOSED SPECIFICATION FOR POSTAL CARS.

The sub-committee of mechanical officers of the Special Committee on Relations of Railway Operation to Legislation after conferences with a committee from the post office department and with the chief engineers of the American Car & Foundry Company, Barney & Smith Car Company, Standard Steel Car Company, Pressed Steel Car Company and the Pullman Company, has drawn up a proposed specification for the construction of all-steel and steel underframe full postal cars. This specification is being sent to the railways for examination and approval. Any suggestions as to modifications should be sent to C. A. Seley, mechanical engineer, Rock Island Lines, Chicago, Ill., before December 1, or representatives of the railways may appear before the committee at a meeting at the New Willard, Washington, D. C., December 4. On the following day, December 5, the committee will meet with the post office department committee. The proposed specification is as follows:

### GENERAL.

*Type.*—Postal cars may be built according to any of the following types of construction: (a), Heavy center sill construction, the center sills acting as the main carrying member. (b), Side carrying construction, the sides of the car acting as the main carrying members having their support at the bolsters. (c), Underframe construction in which the load is carried by all the longitudinal members of the lower frame. The super-structure framing may be of steel or of wood re-enforced as per R. M. S. Specification Plan No. 1. (d), Combination construction in which the side frames carry a part of the load, transferring same to the center sills at points remote from the center plate for the purpose of utilizing uniform center sill area. Steel castings may be used as parts of the underframe in any of the above types.

*Materials.*—All rolled steel plates and shapes used in the car framing shall be made by the open-hearth process. The physical and chemical properties of all material used in the car framing shall be in accordance with the latest standard specifications of the American Society for Testing Materials, as follows: The

standard specification for structural steel for bridges, for steel plates, shapes and bars; the standard specification for wrought iron, for iron bars and plates; the standard specifications for steel, malleable iron and gray iron castings.

*Workmanship.*—All workmanship throughout the car shall be first-class. The jointing of the car framing shall be made so that the structure as a whole shall be built to dimensions specified, and all joints exposed to the weather shall be made tight against leakage.

*Live Loads.*—The car body shall be designed to carry the specified live load in addition to its own dead weight under service conditions. Where no live load is specified the maximum capacity of the car, as determined by wheel loads, shall be used as a basis for calculations.

*Buffing.*—The maximum end shock due to buffing shall be assumed as a static load of 400,000 lbs. applied horizontally at the resultant line of the forces acting at the center line of the buffing mechanism, and at the center line of draft gear respectively, and shall be assumed to be resisted by all continuous longitudinal underframe members below the floor level, provided such members are sufficiently tied together to act in unison.

*Details.*—All connections, except those specified in the second paragraph under end construction shall be designed for the maximum strain to which the member connected shall be subject, and secondary stresses in any members caused by eccentric loads shall be properly combined with the direct stresses in such members. The maximum fiber stress in any member subject to both direct and secondary stresses may be taken at 20 per cent. greater than those given in the paragraph on stresses, but the direct stresses considered alone must not exceed the allowable stresses given in said paragraph.

The minimum distance between centers of rivet holes shall be three diameters of the rivet, and the minimum distance between the center of the rivet hole and a sheared edge shall be not less than one and one-half times the diameter of the rivet. Below the floor line, framing connections of floor beams, posts, etc., may be of rolled steel, pressed plate, or cast steel, and above the floor line such connections may also be of malleable iron. Connections for I-beams, channels or tees may also be made by coping the flanges and bending the web to form a knee, and for angles by coping one leg and bending the other. The use of fillers in the underframe and superstructure shall be avoided wherever possible. All holes for rivets or bolts in the underframe, superstructure and outside finish shall be drilled or punched and reamed to size and fairness. No drifting of holes will be allowed. In deducting rivet or bolt holes to obtain the net area of any section, they shall be taken at 1/16 in. larger than the diameter of the rivet or bolt. The effective area of a rivet shall be taken as its area before driving. All rivets when driven must completely fill the holes and have full concentric heads or be countersunk when required.

*Center Sills.*—The center sills may be built up or composed of rolled or pressed shapes, either with or without cover plates, and cast steel draft sills or end construction may be used in connection with any of the above types, with suitable riveted connections at splices. Built-up center sills may be either of uniform depth or of the fish-belly shape, and may be composed of rolled shapes, web plates, flange angles and cover plates. If preferred, the web plates may be flanged and angles omitted. When flange angles are used they shall be connected to the webs with a sufficient number of rivets to transfer the total shear at any point in a distance equal to the depth of the sill at that point. When cover plates are used they must extend at least two rows of rivets at each end beyond their theoretical length.

*Bolsters and Cross Bearers.*—The body bolsters and cross bearers may be of either cast steel or built-up construction, with ample connections at the center and side sills to transmit the calculated vertical shear.

*Floor Beams.*—Transverse floor beams may be of rolled or pressed shapes, with suitable connections at center and side sills.

*Floor Supports.*—Longitudinal floor supports shall be supported at each transverse floor member.

*End Sills.*—The end sills may be either of rolled or pressed shapes, built-up construction or cast steel, with ample connections at center and side sills. They must be designed for the maximum vertical loads to which they may be subject and also for the assumed horizontal loads transferred from the vertical end members as specified in the third paragraph under "end construction."

### SIDE FRAME.

*General.*—In calculating the stresses in the side frame its effective depth when designed as a truss or girder may be taken either as the distance between centers of gravity of the side plate and side sill or as the distance between centers of gravity of belt rail and side sill. At the side door openings the bending moment caused by the vertical shear at the door post shall be considered as being resisted by the section above and below the door openings, and the sum of the direct stresses and those due to bending at such section shall not exceed the stresses specified. A sufficient proportion of any reinforcing members added to these sections shall be extended far enough beyond the door posts at each side so that their reaction can be taken care of by the side frame without exceeding the limit specified for stresses.

*Posts.*—The sum of the section moduli taken at any horizontal section between the floor and the top line of windows, of all posts and braces on each side of car, located between end posts, shall be not less than .30 multiplied by the distance in feet between the centers of end panels, a panel length being considered as the distance between lines of rivets in adjacent vertical posts.

*Sheathing.*—Outside sheathing plates shall be not less than 1/8 in. in thickness.

### ROOF.

*General.*—The roof may be of either the clear-story or turtle-back type, depending on the standard contour of the railway for whose service the cars are built. In the clear-story type the deck plates shall be in the form of a continuous plate girder, extending from upper-deck eaves to deck sill, and either built up of pressed or rolled shapes or pressed in one piece from steel plates. The carlines may be of either rolled or pressed steel shapes, extending in one length across the car from side plate to side plate, or may extend only across the upper deck. In the latter case the lower deck carlines may be formed by cantilever extensions of the side posts or by independent members of pressed or rolled shapes. In the turtle-back type, the carlines may be of either pressed or rolled shapes, extending in one length across the car between side plate and side plate, or may consist of cantilever extensions of the posts.

*Carlines.*—The projected area of the portion of roof in square feet supported by carlines, divided by the sum of the section moduli of the carlines must not be more than 100.

*Roof Sheets.*—Roof sheets, if of steel or iron, shall be of a minimum thickness of 0.05 in., and either riveted or welded at their edges.

### END CONSTRUCTION.

*Vertical End Members.*—The sum of the section moduli of all vertical end members shall be not less than 35, and the section moduli of the main members, either forming or adjacent to the door posts, shall be not less than 75 per cent. of this amount.

The horizontal reactions of all vertical end members at top and bottom shall be calculated from an assumed external horizontal force applied 18 in. above the floor line, to all vertical members in the proportions given above, such force being of sufficient amount to cause bending of all vertical members acting together, and top and bottom connections of vertical members shall be designed for these reactions.

Except where vertical end members shall bear directly against or be attached directly to longitudinal members at either top or bottom, the assumed reactions shall be considered as loads

applied to whatever construction is used at end sill or end plate, and both these last named members shall have section moduli, respectively, sufficient to prevent their failure horizontally before that of the vertical end members.

*End Plate.*—The end plate may be a rolled or pressed section, or of built-up construction, and shall extend across the end of the car from side plate to side plate, with ample connections at the ends, or shall be of other satisfactory construction to withstand the assumed loads given above.

*Stresses.*—All parts of the car framing shall be so proportioned that the sum of the maximum unit stresses to which any member is subject shall not exceed the following amounts in pounds per square inch, except as modified in the first paragraph under "details," the second and third paragraphs under "end construction." These stresses, unless otherwise stated below, are for steel having an ultimate tensile strength of from 55,000 to 65,000 lbs. per square inch. Where other materials are used, they shall bear the same proportion to the ultimate strength of the material used.

The stress in built-up bolsters shall not exceed 12,500 lbs. per square inch.

The stress in cast steel for bolsters and other details shall not exceed 8,000 lbs. per square inch.

The stress in sills and framing shall not exceed 16,000 lbs. per square inch.

For members in compression the above stresses shall be reduced in accordance with usual engineering practice.

RIVETS (RIVET STEEL).

| | | |
|---|---|---|
| Shear, other than buffing | 10,000 | lbs. per sq. in. |
| Bearing, other than buffing | 20,000 | " " |
| Shear, buffing | 12,000 | " " |
| Bearing, buffing | 24,000 | " " |

*Floor.*—Sub-floor of postal cars to be of iron or steel plate, upper or wearing floor of composition or of matched wooden flooring, maple or yellow pine preferred, with proper insulation. Composition flooring may be secured by corrugated, keystone or equivalent style of plate or by wire fastening which is anchored to the sub-floor.

*Interior Finish.*—Inside, side and end linings and head lining of postal cars to be of flat or corrugated steel plate, composition board or wood, preference in the order named, properly secured to the car framing.

*Insulation.*—Suitable fabric or material shall be used as an insulation against cold or heat in the side and end walls and roof of steel postal cars, securely fastened as the nature of the material may require for efficiency and durability.

*Doors and Windows.*—Postal cars to be equipped with such side doors, end doors and side windows as are shown on the standard plans of the R. M. S. department. Doors and windows may be made of wood or metal and when glazed the glass shall be double strength. Trimmings and locks to be the railway company's standards. Doors and windows, including swinging deck sash, to have suitable weather stripping.

*Lighting.*—Lighting of postal cars primarily to be with electricity or gas with candles provided for auxiliary light. Distribution of light shall be in accordance with the requirements of the working space and doorways. Electric light installations on postal cars shall include distribution, preferably by condulet system with separate circuits, cut-outs, and switchboard regulation; lamps to have shades of railway company's standard. The generator, distribution, battery boxes and their equipment, train connectors, charging plugs, other accessories, and all wiring to be as per the railway company's standard practice. Gas lighting installations on postal cars to be in accordance with the railway company's standard practice.

*Heating.*—Heating of postal cars primarily to be with steam, applied either as a vapor system, with separate regulation for each coil, hot water steam heated, or direct pressure steam, with preference in the order named. Pipes are to have suitable protection guards of wire or perforated steel. For postal cars running into territory requiring them, an auxiliary coal burning stove shall be furnished, complete with coal box and firing tools, smoke jack and protection guards. The stove and coal box to be securely fastened. The stove may be used to heat direct or to heat the coils of an auxiliary hot water system. The train pipe steam line to be applied and equipped with end valves, steam hose and couplings, as per M. C. B. requirements and the railway company's standards.

*Ventilation.*—Ventilation of postal cars of clear-story design to be accomplished by means of swinging deck sash protected by screens. Trimmings of swinging deck sash to be railway company's standards. Postal cars not having clear-story roofs are to have a sufficient equipment of self-acting ventilators in the roof.

*Vestibules.*—Postal cars are to be equipped with railway company's standard short vestibule.

*Couplers and Draft Gears.*—The details of the coupler and draft gear to be in accordance with M. C. B. and U. S. safety appliance requirements, and the practice of the railway for which the cars are built.

*Buffing Mechanism.*—The details of the buffing mechanism to be in accordance with the practice of the railway for which the cars are built.

*Brake and Signal Equipment.*—Postal cars to be equipped with automatic air brakes and signal equipment of the latest design railway company's standard. Hand brakes in accordance with U. S. safety appliance standards. Brakes to be applied to all wheels, and to be preferably arranged inside on four-wheeled trucks. The braking power should not be less than 80 per cent. of the light weight of the car, based on 60 lbs. air pressure in the air brake cylinder. Suitable cord or attachments shall be furnished for convenient operation of the conductor's valve and train signal system.

*Steps, Handholds, Signal Brackets.*—The details of the steps, handholds and signal brackets to be in accordance with U. S. safety appliances and M. C. B. requirements and the practice of the railway for which the cars are built.

*Stanchions and Screens.*—Permanent stanchions in storage ends and at ends of pouch racks, screen frames, and screens to be located as per standard R. M. S. plans.

*Safety Bars.*—Safety bars to be applied in an equivalent manner to that called for in R. M. S. specifications, plan No. 1.

*Interior Equipment.*—The following list of equipment shall be arranged as shown on standard R. M. S. drawings, the details as per railway company's standards: letter cases, pouch racks, paper boxes, distributing table, hinged table, shelf and letter drop, general order case and tag case, drawers, pouch catcher, cinder guards and brackets, hopper, wash stand, water cooler, water tank, mirror, wardrobe, fire buckets, fire extinguishers, and wrecking tools.

TRUCK.

*General.*—Trucks may have either the built-up metal or cast steel frames, and may be either of the four-wheel or six-wheel type, within the limit of wheel loads given below. For cars equipped with one cast iron brake shoe per wheel the effective maximum emergency brake shoe pressure must not exceed 18,000 lbs. per shoe. When two brake shoes per wheel, or one shoe per wheel having a higher coefficient of friction than cast iron are used, the wheel loads may be increased to the allowable carrying capacity of the M. C. B. standard rules.

*Wheel Loads.*—Maximum weight of loaded cars must not exceed 15,000 lbs. per wheel for M. C. B. standard axle having 5 in. x 9 in. journals, or 18,000 lbs. per wheel for M. C. B. standard axle having 5½ in. x 10 in. journals.

*Details.*—Wheels shall be either all-steel or steel-tired. All other truck details, including body and truck center plates and side bearings, shall be in accordance with M. C. B. requirements and the practice of the railway for whose service the cars are built.

*Painting.*—The painting of car body and trucks shall be in accordance with the railway company's specifications for steel cars.

*Lettering and Numbers.*—The lettering and numbers of postal cars to conform to R. M. S. requirements and the railway company's standards.

## IS BIG BUSINESS AN INDUSTRIAL EVIL?*

BY FAIRFAX HARRISON,
President, Chicago, Indianapolis & Louisville.

On one of the few occasions when I came into personal contact with Mr. Harriman, I went to his office, by appointment shortly before his death, to ask him to do something, and was told that he was ill in bed, but would see me if I came uptown. He was then living in a rented house on upper Fifth Avenue, one of those typical New York houses of melancholy exterior and Persian splendor within. I was shown up to a room on the second floor, a gorgeous high ceilinged chamber fretted with gilding and heavy with hangings, and there on a little iron camp bed between the windows lay that redoubtable Captain of Industry. It seemed to me as I entered that he was all eyes and spectacles. I thought of a spider, of an owl at night, but I soon felt most of all the intense luminousness of his gaze, the undaunted spirit shining through and suffusing the frail body. I asked him what I came to ask and received a curt refusal, and rose to go, but he bade me wait and presently plied me with questions about the railways in the southeast. I was astonished at the detail of his knowledge of the map, he seemed to be as ready in his reference to junction points as a rate clerk, but seemed also to know minutely the financial structure of the various systems, their physical condition and the ruling grades of their principal arteries of traffic. He spoke briefly but eloquently of the inevitable growth and prosperity of the South and its requirement of transportation facilities, and then proceeded to outline a plan, which he said he would some day accomplish, for a common control of all the main lines of railway in the territory, and so make possible the pouring of their accumulated traffic upon that line which should be found to be physically best suited for development and efficient operation. He swept aside the difficulties of hostile public opinion and hobbling statutes in a serene confidence that the end was economically desirable. "They will come to understand it," he said. I confess that I gasped. At intervals during the conversation he would turn to the telephone standing on the table beside the bed, seize it and

"in his hand
The thing became a trumpet."

Sudden winged words, abrupt but unmistakable in their command, were transmitted to his office to be distributed over the far-flung battle lines of his power and responsibility, and then in an instant he would courteously turn to renew what he was saying to me.

On that narrow bed lay the slender and physically feeble embodiment of the "Big Business" which is now being everywhere haled before the bar of Public Opinion.

Because of the manner in which the subject is handled by some government officials and their magazine allies, it sometimes seems that it is mere bigness of business which is now regarded as an offense, and one is struck by the anomaly of this attitude with the traditional worship of mere bigness by the American people. Foreign observers have made a by-word of the frequency of our proud and indiscriminate boasts of the size of things, of population, of the height and cost of buildings, of the bulk of the Congressional Record, of the number of animals slaughtered in stock yards, of the miles of road in a railway system, "of cabbages and kings."

At the dinner of the American Iron and Steel Institute in Chicago last winter Baron von Bodenhausen, one of the visiting German steel manufacturers, told with gusto of his bet on arriving at Chicago, with a colleague who had never before been in the United States, that before they had reached their hotel they would be told of at least two things which in Chicago were the "biggest in the world," and how he had won his bet before they left the station. It is almost a national characteristic to be proud of things because they are big, and we are naturally astonished by an attack for that very reason on some of the institutions which the man in the street has most loudly acclaimed as typical American achievements. But fortunately we have realized that, while only the biggest trusts have been pilloried as yet, they are on trial, not for their size, however that fact may be used to promote opinion hostile to them, but for deeds and industrial tendencies which are those also in kind of the lower middle class trusts and even of some individuals. We are not always convinced of this by the words of the politicians, because, alas, we are not always persuaded of their sincerity, but our understanding of the public opinion which supports the attack comes out of the mouths of those publicists whose impartial habit of mind, aloofness of view and intellectual sanity command our respect. Among these stands at the top President Eliot of Harvard, who has recently illumined our existing industrial problems in an oration, delivered in historic Faneuil Hall on the Fourth of July last, a sober analytical discussion which contains much to give pause to the serene complacency of those who say that the attacks on big business are mere effusions of politicians. His argument is that the American people who declared their independence in 1776 were, by reason of their individualism, industrially sounder than are we today: "they were by inheritance and occupation and through such public instruction as they received, an independent people. Every man owned his own means of production"; that while we still enjoy the political independence they achieved, we are sunk, by the tyranny of the "industrial government" to which we are now subjected, into a dependence far more evil than that which the man of 1776 threw off. He says:

"The huge monopolistic industrial combinations, the combinations among financial institutions which put great masses of capital within the control of a few persons and the large-scale retail establishments, in which captains are few and subordinates many, all tend to diminish the personal independence of the average man or woman. The trades unions take a strong hand in reducing the personal independence and practical liberty of the journeymen in their respective trades. In short, it is impossible that the clerks, operatives, salesmen, and trades unionists of today should be as independent, self-reliant and enterprising as the pioneers, farmers, fishermen and uncontrolled mechanics of 1776 were."

It is not to be suggested that in thus preferring the economic and industrial condition of our revolutionary forebears, Dr. Eliot is a mere *laudator temporis acti;* that he has indulged the predilection of the elder statesmen for reminiscence of the "good old times," for he best of all knows that it is impossible again to reproduce that condition, to turn back the clock to that simple and virile individualism, which he exalts. The interval since the American Revolution has been the time in which, as the poet foresaw, "the individual withers, and the world is more and more." It is no longer individuals who compete in manufacture and trade, nor even groups of individuals, but nations themselves are now arrayed in militant industrialism: and the conditions affecting the average man which such competition creates are common to all the commercial nations of the present day. The industrial pain which we are now suffering is not peculiar to us, but is a *weltschmerz* which we share with all our national competitors. If it were not true that the development of our big business had in the main been along the lines of increased production and reduced cost, in a word, of efficiency, it is not likely that we would long survive in the crowded markets of the world, for the man of 1776 with his individualistic methods could no more compete in modern world industrialism than could Achilles, whose loud war cry and personal prowess swept to destruction the champions of Ilium, prevail against the discipline and organization and preparedness of Gen. Oyama.

We must recognize that the growth of our activities from small to large units has been attended by lamentable mistakes and consequent evil, but if we agree that today large units are

*An address before the National Association of Freight Traffic Officers, Cincinnati, Ohio, November 17.

necessary for efficiency, it would seem that our efforts should be directed to amelioration of the conditions which make for evil rather than by victorious indulgence in that modern sport of kings, "trust busting," whereby the good is destroyed with the evil. It is in this respect that the present attitude of the government towards business disturbs those serious students who observe contemporary economic history. There was a time when an attorney general of the United States was able to say, after a notable forensic victory, that "the government of the United States will not run amuck," but today we find not only that the responsible officers of government are performing their sworn duty in enforcing the Sherman law, as every sane man must respect them for doing to the last extremity, but also, in public utterances, are they advocating and defending the outworn policy of the lethal statute. We are told with solemn authority that competition between individual producers must be restored to its old place in industrial life, not merely because the law of 1890 so ordained, but because, forsooth, that is sound economic policy today. It is a summons of the sturdy pre-Revolutionary fishermen and the farmers from the mists of time.

Competition between individuals in their economic situation was indeed necessary because some competition is always a necessary element of a sound industrial life, and they could have no other, but inasmuch as we must now compete as a nation with other nations to preserve our existence, it seems better to concentrate our energies on the effort for individual efficiency than to waste our aggregate strength in domestic quarrels. An audience of railway traffic officers is perhaps best of all qualified to testify to the folly of unrestricted competition between individuals or groups of individuals even on the largest scale. Who here can "point with pride," as the political platforms say, to the competition in rates which has made past railway history to scarlet; the recurring incidents of solemn compact and flagrant disregard of the pledged word; the hectic fluctuation of prices of necessities; the disturbance of security values and of business generally, which were consequent upon rate wars? No one but the gambler benefited by such evil days, yet these are the things which were the direct and notorious consequence of the kind of competition which is now proposed to reinstate. It was indeed in the effort to secure stability of business against this cut-throat competition that many of the mergers of railways were accomplished and some of the existing great systems were built up; yet the men who brought this about never dreamed that they were committing crime. In their hearts they were proud of what they had done, as men are apt to be of the deeds they accomplish with high purpose, but as the conscious criminal seldom is.

Whatever may be the case of the manufacturer, the railway officer is today fortunately under no necessity to observe the presidential admonition and search his heart for the motives of his business life, for there has been supplied for the railway officer an effective remedy for the evil consequences of unrestricted competition, namely: Regulation, and that, I maintain, is the true medicine for the industrial situation generally.

We have seen in a few years the development of the policy of regulation of the railways to a remarkable standard of success measured by the results obtained. In making this statement I am not likely to forget the preliminary failure of methods of regulation, the incompetence, the inefficiency, nay, even the insincerity of its administration at times, and, worst of all, the evil inconsistency of dual regulation by state and federal government in respect of the same subject matter at the same time; but accepting these hardships in a large sense because of the end to be ultimately attained, we must recognize that the incidence of regulation has already enabled railway officers to do many things, which in their hearts they always wanted to do, and to end some abuses—notably rebates and free transportation—which were always offensive. Regulation has also done much to secure railway investments as a whole on a safer and firmer foundation than ever they were: it is true that fewer "melons" are now cut; there are fewer sensational rises in security values on the stock exchange; there is less buying and selling of whole railways, and, for the moment, there is even less construction, but the railway securities which have real merit are today tending more nearly to reach an equilibrium of investment value with an assured return at a reasonable rate.

Those who have been wont to buy railway stocks for the sake not of the income, but of the possible profit from an expected increment in market value, are discontent, and it is from Wall street that we hear the most violent criticism of regulation. Of course, there are, and for a long time will continue to be, some railway officers who oppose regulation from habit and conviction. We all know the fine old-fashioned railway officer who achieved his promotion and present dignity in the rough and tumble days and who continues to rely upon brute force in resisting regulation, because he only sees the hardships which it entails upon the railways and the inefficiency of those who administer the régime. He is as unable to adjust himself to modern conditions in which regulation is an accomplished and accepted fact, as would be an antediluvian beast, but it will not be long before he can be found only in the museums beside the ichthyosaurus and the diplodocus.

In the paper from which I have already quoted, but with which I regret I cannot altogether agree, Dr. Eliot recognizes what I here maintain, that the remedy for the industrial evil in big business lies in regulation; and, in his judgment, the only alternative is government ownership. "Hence," he says "in a democracy, if a monopoly be natural and inevitable, or, in other words, indispensable to efficiency, it must be either regulated or assumed by government."

With a conservative government policy towards business, big and little, no man can venture to foretell the industrial future of the United States. We hear our political liberty lauded from every platform, our natural resources rehearsed on every hustings, but we do not so often take stock of what is today perhaps our chief economic advantage, namely: that we have led the world in adjusting ourselves to increased costs. What has caused those increased costs in another question. Be it the increased volume of gold available for the arts and as the basis of circulating currency, or be it something else, the tendency is apparent in every commercial community throughout the world. In the United States every manufacturer, like every responsible railway officer, knows that in the last ten years his costs have actually increased and that he has had to adjust his business to new conditions. Sometimes it has seemed that during the process disaster must result, but with few exceptions the adjustment has been made and wherever accomplished it is a victory "no less renowned than war." Our two principal industrial rivals, England and Germany, have still to make this adjustment. We have recently witnessed a bloodless revolution in England, which preludes the early realization of a just expectation of British labor for higher wages, and keen observers report that something of the same kind is pending in Germany. Think for a minute what this might mean to the commerce of the United States. We are already paying the highest wages in the world, and yet today, through efficiency and low transportation charges, we are able to compete with those nations in which the question of a living wage for labor is just beginning to find effective voice and a response from government. That their production costs will go up is inevitable, and when they do we should come into an era of national prosperity which would be unexampled. The risk is that government shall meanwhile have wiped out the margin of our prospective advantage by limiting efficiency through fear of the bogy monopoly. Let us pray that statesmanship may see in Big Business the instrument destined to reap this rich harvest of opportunity and, through Regulation, find means to purge it of its evils, but at the same time foster its strength and efficiency.

## ECONOMIES EFFECTED BY MALLET LOCOMOTIVES ON THE NEW YORK CENTRAL & HUDSON RIVER.

The introduction of 26 Mallet locomotives has increased the operating capacity of a single track division on the New York Central & Hudson River 40 per cent. without the construction of a single mile of new track. They replaced the heavy consolidation locomotives in slow freight road service on the Pennsylvania division, and made it possible to handle 1,400 cars in twenty-four hours, as compared to 1,000 cars under former conditions. A Mallet locomotive now hauls a 4,000-ton train over the division, a profile of which accompanies this article, without assistance. In addition to the heavy grades there are many curves, some as sharp as 8 degs. Pusher service has been eliminated and the 26 Mallets are now able to handle the entire traffic, replacing 60 consolidation locomotives. As the maximum train load has been increased, the number of trains per day has been decreased by ten each way. The congestion of traffic, therefore, has been relieved and the amount of overtime has been reduced 80 per cent. The Mallets save on an average 35 per cent. of the fuel burned per ton-mile, as compared to the consolidations, or, in other words, they make 54 per cent. more ton-miles per ton of coal.

The consolidation locomotives which were replaced weighed 236,000 lbs. each, and had a tractive effort of 45,700 lbs. By using two of these engines on ruling grades it was possible to take a maximum train of 3,500 tons over the road at an average speed of 15 to 18 miles per hour. Under these conditions 60 consolidation locomotives were required, of which 31 were used in road service and 29 in pusher service. Four pushers were stationed at Beaver Dams, N. Y., one at Corning Junction, 20 at Stokesdale Junction, Pa., 2 at Newberry Junction and two for helping around the wye at Avis. Under these conditions the maximum operating capacity of the single track was so nearly reached that overtime was excessive. A careful study of the situation showed that the operating capacity could be increased only by double tracking the line, or by increasing the weight of the trains by the use of heavier motive power. The latter caurse was adopted as being the most economical, and it was decided to attempt to secure a locomotive capable of handling a train of 70 cars, the maximum which the existing sidings would hold, without assistance over the division at an average speed of from 10 to 14 miles per hour. The Mallet locomotive seemed to offer the best solution of the problem. One of these locomotives of the 2-6-6-2 type had been ordered from the American Locomotive Company for use on another division, and it was decided to thoroughly test it out on the Pennsylvania division.

### TESTS.

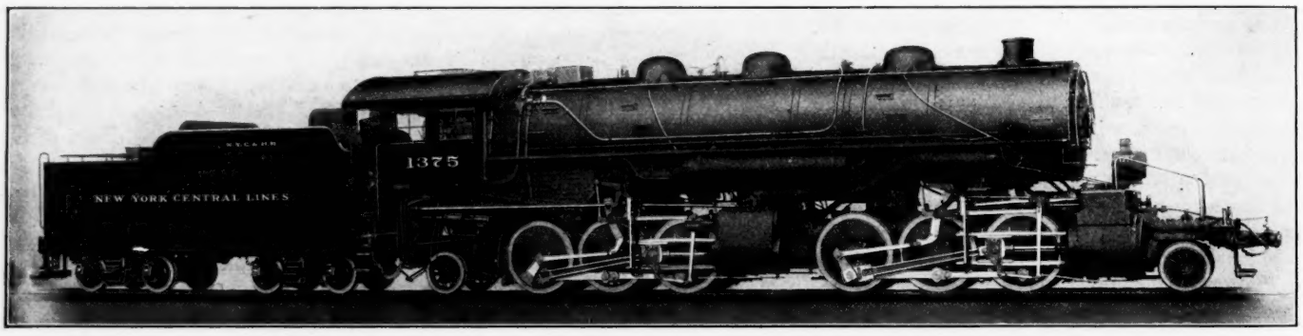
Two separate series of tests were made; in the first one the Mallet was found to give a considerable economy in fuel consumption per unit of work, as compared with the consolidation when operating under the conditions for which it was designed originally, i. e., low speed, heavy freight service in which the maximum draw bar pull at slow speeds was used over the greater part of the division. The Pennsylvania division, however, required a wider range of operating conditions, and the committee in charge of the tests recommended certain changes, such as the application of a superheater, in order to secure greater economy and increased capacity at higher speeds. The locomotive was returned to the Schenectady plant of the American Locomotive Company and equipped with a superheater, a Security brick arch and was otherwise prepared for the operating conditions under which it was to be used.

A second series of tests were then made which proved conclusively that highly superheated steam used in conjunction with compound cylinders gave greater economy in operation. As a result of the tests 25 additional Mallets were ordered and have been placed in service. These were slightly modified from the tested locomotive, as may be seen by reference to the comparative table of dimensions of the locomotives.

Table 1.—General Dimensions of Locomotives Tested.

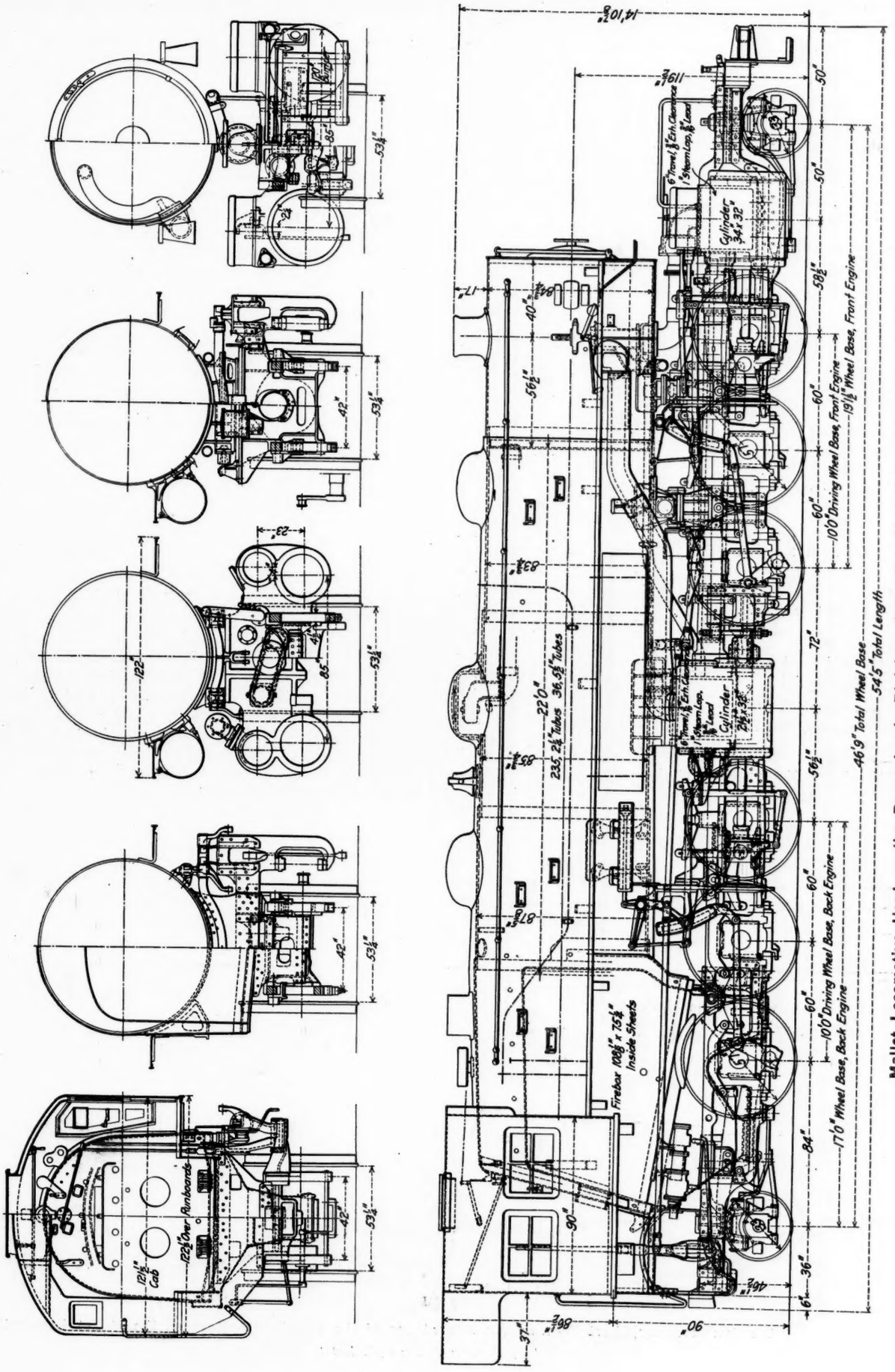
| | N. Y. C. Consolidation. Class G.6.G. | P. R. R. Consolidation. Class H.8.B. | Mallet as Modified in Second Test. | Mallet as Finally Ordered. |
|---|---|---|---|---|
| Maximum tractive effort, lbs.... | 45,700* | 45,300* | 66,600 | 67,500 |
| Maximum tractive effort (working simple) lbs. ..... | ..... | ..... | 79,900 | 81,000 |
| Wt. on driving wheels, lbs..... | 211,000 | 211,700 | 304,500 | 301,500 |
| Wt. on leading truck, lbs..... | 25,000 | 26,900 | 25,000 | 26,000 |
| Wt. on trailing truck, lbs..... | ..... | ..... | 22,500 | 26,500 |
| Wt., total of engine, lbs..... | 236,000 | 238,600 | 352,000 | 354,000 |
| Wt. of tender, lbs..... | 147,400 | 158,000 | 152,700 | 153,700 |
| Wt., total of engine and tender, lbs. ..... | 383,400 | 396,600 | 504,700 | 507,700 |
| Wheel base, rigid, ft. and in.... | 17- 6 | 17- ½ | 10-0 | 10-0 |
| Wheel base, driving, ft. and in.. | 17- 6 | 17- ½ | 30-8½ | 30-8½ |
| Wheel base, total of engine, ft. and in. ..... | 26- 5 | 25-9½ | 46-4 | 46-9 |
| Wheel base, total of engine and tender, ft. and in..... | 60-11½ | 59-5⅜ | 74-8 | 75-8 |
| Cylinders, diameter, in..... | 23 | 24 | 20½ & 33 | 21½ & 34 |
| Cylinders, stroke, in..... | 32 | 28 | 32 | 32 |
| Wheels, diameter of driving, in.. | 63 | 62 | 57 | 57 |
| Wheels, diameter of truck, in.... | 33 | 33 | 33 | 33 |
| Wheels, diameter of trailing, in.. | .. | .. | 33 | 33 |
| Wheels, diameter of tender, in.. | 33 | 36 | 33 | 33 |
| Boiler pressure, lbs. per sq. in... | 200 | 205 | 210 | 200 |
| Boiler, type ..... | St. top | Belpaire | St. top | St. top |
| Boiler, outside diameter, in..... | 82 | 80 | 83¾ | 83¾ |
| Firebox, length, in..... | 108⅛ | 110¼ | 108⅛ | 108⅛ |
| Firebox, width, in..... | 75¼ | 72 | 75¼ | 75¼ |
| Tubes, number ..... | 446 | 465 | { 235—2¼ { 36—5½ | 235—2¼ 36—5½ |
| Tubes, diameter, in..... | 2 | 2 | 2¼ & 5½ | 2¼ & 5½ |
| Tubes, length, ft. and in..... | 15-½ | 15.0 | 22.0 | 22 |
| Heating surface, tubes, sq. ft.... | 3,512 | 3,665.91 | 4,168 | 4,168 |
| Heating surface, firebox, sq. ft... | 184 | 181.0 | 185 | 197.9 |
| Heating surface, water tubes, sq. ft. | 27 | .. | 13 | 27.1 |
| Heating surface, total, sq. ft.... | 3,702 | 3,846.91 | 4,366 | 4,393 |
| Superheating surface, sq. ft..... | ... | ... | 966.3 | 966.3 |
| Grate area, sq. ft..... | 56.5 | 55.05 | 56.5 | 56.5 |
| Tender, water capacity, gals.... | 7,500 | 7,000 | 8,000 | 8,000 |
| Tender, coal capacity, tons..... | 12 | 17½ | 12 | 12 |

*Calculated on the basis of a mean effective pressure of 85 per cent. of the boiler pressure.




**Mallet Compound Superheater Locomotive; New York Central & Hudson River.**

All of the tests were made under the personal direction of three experts, one each from the New York Central & Hudson River, the Pennsylvania Railroad and the American Locomotive Company. The consolidation locomotives, with which the Mallet was compared, were the best designs of that type of locomotive on the New York Central & Hudson River and the Pennsylvania. No attempt was made to compare the best consolidation locomotive which might be built with the best Mallet, but rather to com-


Cylinder 34" x 32"
Cylinder 28" x 32"
235, 2¼" Tubes 36, 5½" Tubes
Firebox 108⅛" x 75¾" Inside Sheets
100" Driving Wheel Base, Front Engine
19⅛" Wheel Base, Front Engine
100" Driving Wheel Base, Back Engine
170" Wheel Base, Back Engine
46'9" Total Wheel Base
54'5" Total Length
122½" Over Runboards
12½" Cab

Mallet Locomotive Used on the Pennsylvania Division of the New York Central & Hudson River.

pare the modern powerful freight locomotive with the most approved design of about five years ago for the same class of service. The tests are, therefore, valuable in that they indicate the great improvement that has been made in locomotive design within the past few years. The two consolidation locomotives did not differ greatly in general design, and were not equipped with either superheaters or brick arches. The Mallet locomotive had approximately 40 per cent. more total weight and 44 per cent. more weight on driving wheels than either of the consolidations. The tests covered a period of two and a half months.

*Conclusions:*—The final conclusions of the committee as to the advantages of the Mallet were:

Table 2.—Comparison of General Performance of Mallet and Consolidation Locomotives Under Different Speed Conditions.

| | Approximate average speeds. | Type of Locomotive. 2-8-0 | 2-6-6-2 | Per cent. in favor of Mallet as compared with consolidations, |
|---|---|---|---|---|
| Number of cars | 12.5 | 41.5 | 65.3 | 57.3 |
| | 15.0 | 36.7 | 58.2 | 58.6 |
| | 17.5 | .... | 40. | .... |
| | 21.0 | 25.5 | .... | .... |
| Average weight per car, tons | 12.5 | 60.15 | 57.2 | .... |
| | 15.0 | 55.12 | 59.5 | .... |
| | 17.5 | ..... | 64.7 | .... |
| | 21.0 | 60.47 | .... | .... |
| Total tonnage behind tender | 12.5 | 2,495.5 | 3,734 | 49.6 |
| | 15.0 | 2,017.5 | 3,461 | 71.5* |
| | 17.5 | ..... | 2,588 | .... |
| | 21.0 | 1,542 | ..... | .... |
| Total elapsed time, hours | 12.5 | 5.89 | 6.86 | .... |
| | 15.0 | 4.65 | 5.00 | .... |
| | 17.5 | 3.51 | 4.51 | .... |
| | 21.0 | .... | .... | .... |
| Running time, hours | 12.5 | 4.605 | 4.58 | .... |
| | 15.0 | 3.765 | 3.87 | .... |
| | 17.5 | ..... | 3.37 | .... |
| | 21.0 | 2.82 | .... | .... |
| Average speed, running time, m.p.h. | 12.5 | 12.75 | 12.9 | .... |
| | 15.0 | 15.7 | 15.2 | .... |
| | 17.5 | .... | 17.5 | .... |
| | 21.0 | 21.4 | .... | .... |
| Coal per ton-mile, lbs | 12.5 | 0.1275 | 0.077 | 39.6 |
| | 15.0 | 0.1392 | 0.084 | 39.6 |
| | 17.5 | ..... | ..... | .... |
| | 21.0 | 0.1418 | 0.086 | .... |

*This relatively higher percentage in favor of the Mallet is probably due to the fact that the consolidations were not loaded to their full capacity at 15 miles per hour.

"Economy in train operation due to the larger output in ton-miles per locomotive.

"Greater economy in coal per unit of power due to the larger boiler available, and especially to the use of compound cylinders and superheated steam.

"Judging from the construction of the parts of this locomotive and its riding qualities, with the ability to take curvatures as represented on the division over which the tests were made, there would seem to be no reason to expect any undue injury to the locomotive itself when running at a speed of 30 miles per hour.

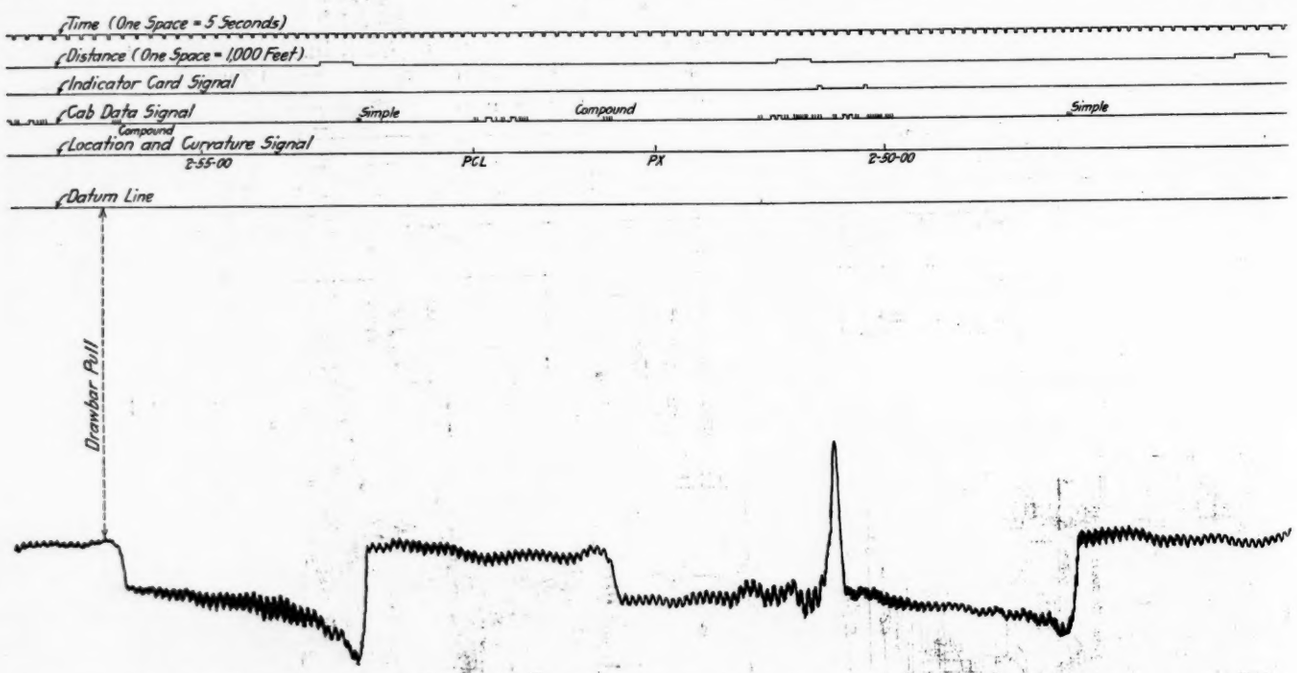
"On return trips from Stokesdale, a number of the runs were made at speeds which would indicate that 30 miles per hour would not be at all detrimental to the locomotive itself."

"As to injury to the track at speeds of 30 miles per hour, the weight per axle for the Mallet locomotive is very much below that which is common practice with passenger locomotives, where as high as 60,000 pounds per axle is often employed, and from this standpoint, it is considered that no undue injury would be occasioned to the track suitable for consolidation locomotives similar to the G. 6 G., with a locomotive of this type."

### TEST DATA.

All tests were made over the portion of the road from Avis yard, Jersey Shore, to Stokesdale Junction, Pa., a distance of 63.07 miles. The runs were confined exclusively to the northbound movement, the engines being turned at Stokesdale Junction and returned light to Avis. The descending grade from Stokesdale to Corning, the end of the division, made a continuance of the run through to the latter point necessary. All observations were begun at Torbert, 4.24 miles north of Avis. This made it possible to get the locomotive in good running condition, and the fire built up ready for taking observations. From the profile it will be seen that the remaining distance of 58.83 miles from Torbert to Stokesdale Junction is entirely ascending grade, with the exception of about 4.5 miles of level track distributed over six places, and 1.19 miles of descending grade occurring at two points. As nearly as possible all the runs of the Mallet in the second test were made under the same conditions as those in the first. The same crew operated the locomotive, and the weather and rail conditions were approximately the same.

The following data shows a comparison between the performance of the modified Mallet used in the second test and the average




**Portion of the Dynamometer Chart Showing the Advantages of the Simpling Feature on the Mallet Locomotive.**

*One-quarter Inch of Drawbar Pull is equivalent to about 7,850 lbs.*

for the two classes of consolidation locomotives previously tested. The coal used in both tests was good and of uniform quality. By far the greater proportion came from the same mines. The average of the samples analyzed showed:

| | | |
|---|---|---|
| Volatile matter | 25.26 | per cent. |
| Fixed carbon | 64.28 | per cent. |
| Ash | 10.44 | per cent. |
| Moisture | 3.444 | per cent. |
| Sulphur | 1.922 | per cent. |
| B. T. U. (dry coal) | 13,802 | |

*The General Performance:*—The most important comparison shown in Table 2 is the saving of 39.6 per cent. in coal burned per ton-mile in favor of the Mallet. This is very little higher than the average of 35 per cent. which is secured in actual daily service. The significance of the economy in fuel per unit of work done is strikingly brought out by the comparison in Table 3. From these figures it will be seen that because of the saving of 39.6 per cent. in the fuel consumed per ton-mile, the Mallet makes 61.2 per cent. more ton-miles than the consolidations on the same amount of coal.

TABLE 3.—COMPARATIVE PERFORMANCE IN TON-MILES PER TON OF COAL OF MALLET AND CONSOLIDATION LOCOMOTIVES.

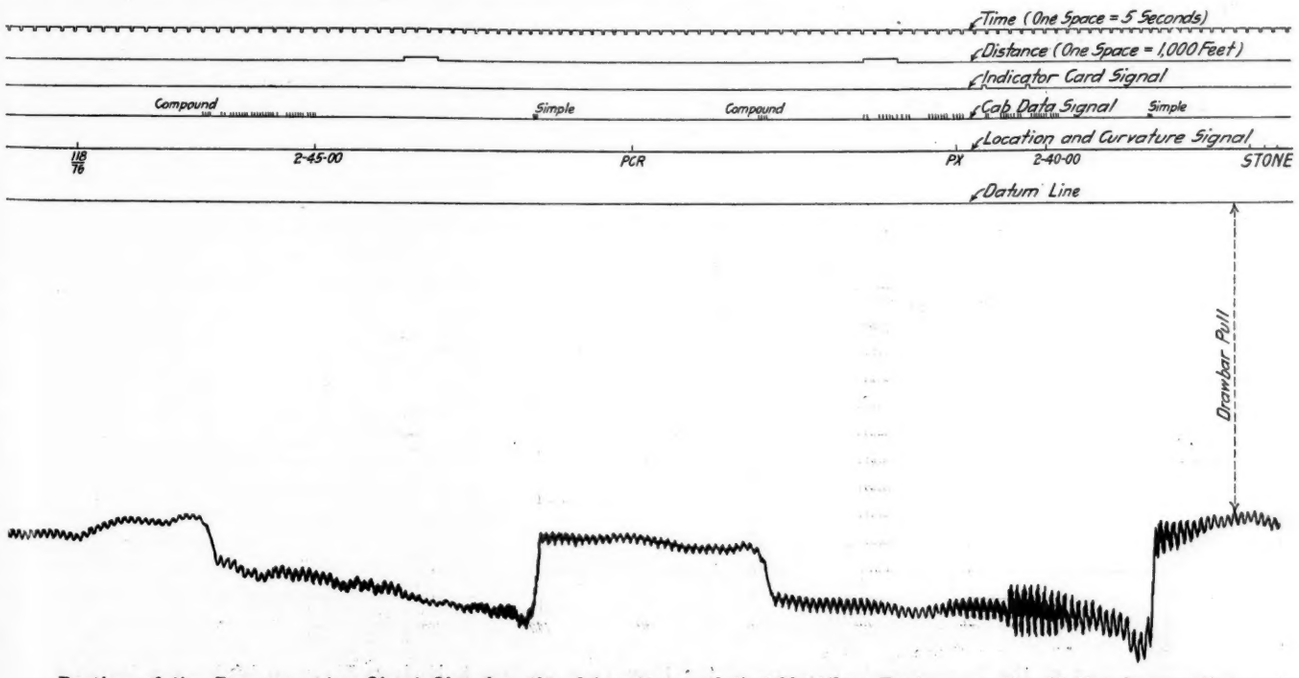
| Approximate average speeds. | Ton-Miles Per Ton of Coal. 2-8-0 Type. | 2-6-6-2 Type. | Per cent. in favor of Mallet as compared with consolidations. |
|---|---|---|---|
| 12.5 | 16,219.5 | 26,610 | 63.9 |
| 15.0 | 14,807.5 | 23,872 | 61.2 |
| 17.5 | ..... | 23,148 | .... |
| 21.0 | 14,898 | ..... | .... |

Table 2 also shows that, within the range of speeds in which it is operated in actual service, the increase in the normal theoretical maximum tractive effort of the Mallet, as compared with the simple locomotives, is fully realized at the draw bar. With a theoretical tractive effort, 45 and 47 per cent. gerater, respectively, than the New York Central and the Pennsylvania consolidation locomotives, the Mallet hauled approximately 49 per cent. more tonnage than the average of the two at approximate speeds of 12½ miles per hour. On these runs both consolidation locomotives were loaded to their full capacity. At approximate speeds of 15 miles per hour, the Mallet shows a still greater relative hauling capacity. In this case, however, it is possible that the consolidation locomotives did not have the maximum tonnage they could handle at that speed. The records for the lower speed may consequently be most conservatively taken as an accurate measure of the relative hauling capacities of the three classes of locomotives in the slow-speed drag service.

One run of the series was made to determine the maximum train load that the Mallet locomotive would haul over the division without stalling. The locomotive was given 63 steel cars and a caboose, making a total load of 4,465 tons behind the tender. This run demonstrated clearly the advantage of the reserve capacity available with the system of compounding used, which makes it possible to secure an increase of 20 per cent. in power by the use of steam direct from the boiler in both the high and low pressure cylinders by the separate exhaust from the high pressure cylinders and the intercepting valve. By means of these special devices, the back pressure on the high pressure cylinders is reduced when working simple, and the increased power is secured without sacrificing the equal distribution of the work between the two engines. With this reserve power to use in a pinch and get the train over the critical points an otherwise prohibitive train load was taken over the divison wthout stalling. The hardest portion of the line was from mile posts 123 to 118, and simpling was resorted to at a number of critical points. This is clearly shown on a portion of the dynamometer diagram, which is reproduced. By the same means the hard pull north of Cedar Run was successfully accomplished. The total amount of the time during which the locomotive was simpled was approximately 8 per cent. of the time the throttle was open; an average speed of 10.6 miles per hour was made.

On many roads short grades on a division, though not of sufficient importance to warrant pusher service, necessitate the reduction of 500 tons or more in the maximum train load which could otherwise be taken over the division. With the increase of 20 per cent. in power actually available in the type of Mallet tested for such emergencies, these critical points can be surmounted and so much through tonnage gained.

*The Boiler Performance:*—The comparison in Table 4 emphasizes the advantage in fuel economy of having a large boiler with an ample margin of capacity above the average demands on it. At approximately the same rate of combustion, the Mallet gave an increase in equivalent evaporation per pound of coal varying from a maximum of 18.8 per cent. to a minimum of 13.58 per cent. In the thermal efficiency of the boiler the Mallet showed a distinct superiority over the consolidation locomotives, ranging from a maximum of 17.7 per cent. to a minimum of 13.62 per cent.




**Portion of the Dynamometer Chart Showing the Advantages of the Simpling Feature on the Mallet Locomotive.**

*One-quarter Inch of Drawbar Pull is equivalent to about 7,850 lbs.*

Table 4.—Comparison of Boiler Performance of Mallet and Consolidation Locomotives.

| | Approximate average speeds. | Type of Locomotive. 2-8-0 | 2-6-6-2 | Per cent. in favor of Mallet as compared with consolidations. |
|---|---|---|---|---|
| Dry coal fired per hour | 12.5 | 4,033.5 | 3,680 | .... |
| | 15.0 | 4,420.5 | 4,423 | .... |
| | 17.5 | ..... | 3,985 | .... |
| | 21.0 | 4,957 | ..... | .... |
| Equivalent evaporation per hour, lbs. | 12.5 | 33,957.5 | 36,849 | 8.5 |
| | 15.0 | 36,807. | 41,819 | 13.6 |
| | 17.5 | ..... | 36,203 | .... |
| | 21.0 | 39,859.5 | ..... | .... |
| Equivalent evaporation per pound dry coal | 12.5 | 8.42 | 10.01 | 18.8 |
| | 15.0 | 8.32 | 9.45 | 13.58 |
| | 17.5 | .... | 9.08 | .... |
| | 21.0 | 8.04 | .... | .... |
| Equivalent evaporation per hour per sq. ft. of heating surface, lbs. | 12.5 | 10.15 | 9.32 | .... |
| | 15.0 | 11.008 | 10.58 | .... |
| | 17.5 | ..... | 9.16 | .... |
| | 21.0 | 11.914 | .... | .... |
| Coal fired per sq. ft. grate per hour for time throttle was open | 12.5 | 72.34 | 65.13 | .... |
| | 15.0 | 79.26 | 78.28 | .... |
| | 17.5 | ..... | 70.54 | .... |
| | 21.0 | 88.91 | ..... | .... |
| Boiler horsepower | 12.5 | 984.25 | 1,069.1 | 8.6 |
| | 15.0 | 1,066.9 | 1,212.1 | 13.6 |
| | 17.5 | ..... | 1,049.4 | .... |
| | 21.0 | 1,155.35 | ..... | .... |
| Temperature in smokebox | 12.5 | 616. | 519. | .... |
| | 15.0 | 633. | 522.9 | .... |
| | 17.5 | .... | 495.2 | .... |
| | 21.0 | 633.5 | ..... | .... |
| Temperature in firebox | 12.5 | 1,805.5 | 1,742 | .... |
| | 15.0 | 1,783.5 | 1,936 | .... |
| | 17.5 | ..... | 1,785 | .... |
| | 21.0 | 1,868 | ..... | .... |
| Thermal efficiency of boiler, per cent. | 12.5 | 58.68 | 69.07 | 17.7 |
| | 15.0 | 58.63 | 66.62 | 13.62 |
| | 17.5 | ..... | 68.60 | .... |
| | 21.0 | 57.51 | ..... | .... |

*Performance of Locomotives as a Whole:*—The true measure of the relative economy in coal consumption of two locomotives is the comparative amount of dry coal burned per dynamometer horsepower per hour. In such a comparison, local conditions, such as profile and variation in train loading, are eliminated. On this basis, Table 5 shows an economy in fuel in favor of the Mallet, ranging from a maximum of 39.8 per cent., at speeds of 12½ miles per hour, to 34.4 per cent. at 15 miles per hour. The comparatively low figures for the machine friction of the Mallet, which were verified by a subsequent test made by hauling the locomotive with an electric locomotive, are of interest. They reflect the advantage in the Mallet type of construction of the reduction in the unit weight on the moving parts and the shorter rigid wheel base. In spite of the greater number of journals and moving parts, the Mallet showed a higher machine efficiency than the consolidation type.

Table 5.—Comparison of Performance as a Whole of Mallet and Consolidation Locomotives.

| | Approximate average speeds. | Type of Locomotive. 2-8-0 | 2-6-6-2 | Per cent. in favor of Mallet as compared with consolidations. |
|---|---|---|---|---|
| Average speed running time, miles per hour | 12.5 | 12.75 | 12.9 | .... |
| | 15.0 | 15.7 | 15.2 | .... |
| | 17.5 | .... | 17.5 | .... |
| | 21.0 | 21.4 | .... | .... |
| Average drawbar pull, lbs. | 12.5 | 22,726 | 34,071 | 49.9 |
| | 15.0 | 19,883 | 31,360 | 56.9 |
| | 17.5 | ..... | 23,424 | .... |
| | 21.0 | 15,930 | ..... | .... |
| Maximum starting drawbar pull, lbs. | .... | 46,280 | 66,000 working compound | 42.6 |
| | | | 80,000 working simple | 72.8 |
| Machine efficiency, per cent. | 12.5 | 88.85 | 89.21 | .... |
| | 15.0 | 86.17 | 89.16 | .... |
| | 17.5 | ..... | 86.60 | .... |
| | 21.0 | 85.35 | ..... | .... |
| Machine friction in lbs. of drawbar pull | 12.5 | 3,066.5 | 4,468 | .... |
| | 15.0 | 3,517. | 4,083 | .... |
| | 17.5 | ..... | 4,044 | .... |
| | 21.0 | 3,288.5 | ..... | .... |
| Dry coal per dynamometer horsepower per hour, lbs. | 12.5 | 5.235 | 3.15 | 39.8 |
| | 15.0 | 5.295 | 3.47 | 34.4 |
| | 17.5 | ..... | 3.65 | .... |
| | 21.0 | 5.465 | .... | .... |
| Water per dynamometer horsepower, lbs. | 12.5 | 33.465 | 26.80 | 22.9 |
| | 15.0 | 33.56 | 26.83 | 20.05 |
| | 17.5 | ..... | 27.08 | .... |
| | 21.0 | 33.685 | ..... | .... |
| Thermal efficiency of locomotive, per cent. | 12.5 | 3.50 | 5.59 | 59.7 |
| | 15.0 | 3.50 | 5.32 | 52.0 |
| | 17.5 | .... | 5.43 | .... |
| | 21.0 | 3.445 | .... | .... |

The tests clearly demonstrated the advantage of the Mallet for the division on which they were made, and proved that the Mallet when properly designed is not limited to slow speed drag service.

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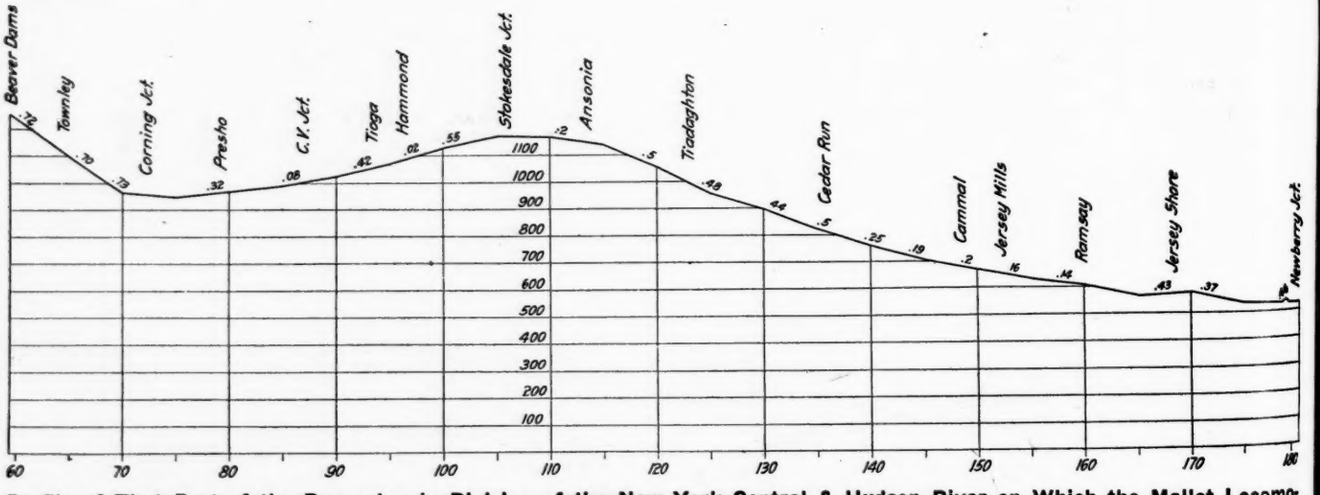
Work is being actively pushed on the construction of the 47-mile line between Jinja, on Lake Victoria Nyanza, Africa, and Kakindu, in the direction of Lake Kioga. This is the first railway to be constructed in the Uganda protectorate, as the Uganda Railway, from Mombasa, on the Indian ocean, to Port Florence, on Lake Victoria Nyanza, lies entirely in the East Africa protectorate. The Jinja-Kakindu line is not destined to become the main line of the Uganda railway system, its primary object being to link up the two lakes. When completed, however, its influence on the traffic of northeastern Africa will be considerable, as it will form the last link but two of a route 3,850 miles long between Cairo and Mombasa, made up of a series of railways and navigable waterways. The two missing links in this route will be from Gondokora to Dufile, and from Wadelai to Foweira, a total of 170 miles.




**Profile of That Part of the Pennsylvania Division of the New York Central & Hudson River on Which the Mallet Locomotives Were Tested.**

## OPPORTUNITIES FOR ECONOMY ON RAILWAYS.

BY L. C. FRITCH, C. E.*

I.

The very nature of the transportation industry, by virtue of its operations being scattered over extensive areas, affords formidable opportunities of waste and extravagance, which in other branches of industrial activity may be more fully controlled and regulated, because of the possibility of supervising more closely their various operations, and thereby reducing waste and extravagance to a minimum.

Waste in our national life has become a byword among other nations. It is claimed that the American people waste enough in their food items to feed the French nation. If this is true of this item of living, it is in a measure true of other expenditures. We are looked upon as a nation that is extravagant in time, efforts, and even in the loss of human lives in our disastrous accidents.

Waste is often the result of a superabundance of the thing wasted. We have our years of plenty and prosperity and become prodigal in our expenditures of time, money and effort until the hand of want is laid upon us, and necessity demands that we observe the laws of prudence which we have so wantonly transgressed. One cannot discount the future and cheat the laws of economy any more than one can overdraw his account in a bank or transgress the laws of health without paying the penalty and facing the day of reckoning.

During a period of prosperity we go from one extravagance to another until a point is reached where in the entire fabric of business is strained to the breaking point. Then a depression sets in. The load is lightened and we hasten to the other extreme and cut below a safe minimum. Such is the history of a cycle of prosperity and depression; and in fact the history of the action of men the world over.

True economy does not mean niggardliness, but it does mean the best for the purpose designed; the best brains in the employee, the best tools in the shop, the best equipment and roadway on railways, and above all an organization which possesses all these in proper proportion and commensurate with its needs.

It has been stated that if commercial business were conducted on the same lines as the railway business, the commercial concerns would go into bankruptcy in a short time. The truth of this statement cannot be admitted. If commercial business were conducted along the lines of our railway business by men without the training of railway men the result would doubtless be disastrous. In the railway business, men are largely thrown upon their own resources and responsibility, and this begets in them self-reliance, and decision, and the ability to act quickly and upon their own judgment. If railway men were situated as men in other industries so that advice and guidance could be secured in their every act, as is possible in commercial concerns, the results secured might be more fruitful. There is no better disciplined army of men in any line of activity than in the railway business and the splendid results achieved by them is a monument to their ability.

There is, however, opportunity for waste, and great waste, in the railway business, in almost all of its various departments and in a greater or less degree on all roads. Much of this waste is unavoidable by virtue of the peculiar nature of the business. But, on the other hand, much of it is unnecessary waste, and a large part of the unnecessary waste is ruthless and inexcusable waste. "Ruthless waste makes woeful want," is as true when applied to the railway business as to our private affairs. No employee would tolerate in his own private affairs the extravagance and waste often witnessed and sometimes practiced in his own employment for the railway company.

It lies within the power of every employee of a railway corporation to practice prudent economy, no matter what his position, or how humble his sphere may be. This may take the form of economy in time, in the use of material, in avoiding possible loss or damage to property and in countless other ways that come to the attention of almost every employee in his daily experience. Every employee owes a duty to the company he serves to safeguard the interests entrusted to him and to regard those interests as faithfully and loyally as though they were his own.

There has never been a time in the history of the railway industry when the need of prudent economy was as urgent as at the present time. The revenues and the operations of railways have been so circumscribed by governmental regulations and laws that the only means of saving the roads from what in many instances must result in ultimate receivership is the enforcement of strict economy in order to enable it to meet its obligations and yield a fair return to the owners of railway property.

In the practice of this economy every employee has a part and should assist in every possible manner for his own pecuniary interest if for no other purpose.

Some splendid results have been secured recently on roads which have made a special effort along particular lines, as by the introduction of efficiency methods and the application of checks on certain operations, resulting in great savings over the old methods.

There are many opportunities for economizing in railway operations, and an effort will be made to point out some particular items where appreciable savings may be effected.

### LOCOMOTIVE FUEL.

One of the largest single items of operating expenses is that of fuel for locomotives. The cost of this item for the past ten years on the railways of the United States has been as follows:

SUMMARY OF COST OF LOCOMOTIVE FUEL.

| Year. | Miles. | Cost of Locomotive Fuel. |
|---|---|---|
| 1910 | 227,525 | $213,838,384 |
| 1909 | 235,402 | 188,735,868 |
| 1908 | 230,494 | 201,905,054 |
| 1907 | 227,454 | 200,261,975 |
| 1906 | 222,340 | 170,499,133 |
| 1905 | 216,973 | 156,429,245 |
| 1904 | 212,234 | 158,948,886 |
| 1903 | 205,313 | 146,509,031 |
| 1902 | 200,154 | 120,074,192 |
| 1901 | 195,561 | 104,926,568 |
| Ten year average, per year | | $166,212,834 |
| Last five year average, per year | | 195,048,081 |

Locomotive boilers are so restricted within rigidly defined limits of space by reason of clearance limitations, and are forced to work under such high demands, that a degree of economy possible in stationary boiler plants cannot be attained in the locomotive boiler. Notwithstanding this, there is an astonishing waste in the use of fuel for locomotives which, if properly conserved, will yield a saving of large proportions on American railways.

The actual distribution of fuel consumed on the average American locomotive has been carefully determined as set forth in Bulletin 402 of the U. S. Geological Survey, and may be stated as follows:

| | | |
|---|---|---|
| (1) | Stand by losses, consisting of fuel used in keeping up steam while engine is standing idle, in starting fires preparatory to taking out on run and fuel left in fire box at ends of runs, amounting to | 20 per cent. |
| (2) | Losses due to vaporizing the moisture contained in the coal, amounting to | 5 per cent. |
| (3) | Wasted on the ground and stolen, amounting to | 1 per cent. |
| (4) | Losses due to unconsumed gases escaping through stack, amounting to | 10 per cent. |
| (5) | Losses due to unconsumed fuel in cinders and sparks, amounting to | 10 per cent. |
| (6) | Losses due to unconsumed fuel in ashes, amounting to. | 3 per cent. |
| (7) | Losses due to radiation, leakage of steam and miscellaneous sources, amounting to | 6 per cent. |
| (8) | Utilized in effective work, amounting to | 45 per cent. |
| | Total | 100 per cent. |

The losses incurred in the use of fuel on railways may be classified into two parts:

First, those due to the limitations imposed upon the locomotive boiler plant, causing thereby certain defects resulting in incomplete combustion and lack of full utilization of the total heat units in the fuel. Many of the defects or deficiencies may

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be overcome, and some of them are in gradual process of elimination or improvement.

Second, the losses due to carelessness or inefficiency of the human element in firing fuel on locomotives. Much of this loss, if not all, may be eliminated by a process of education of fireman in proper methods of firing and co-operation on the part of the engineer in so working the locomotive that fuel will be fired at the proper time and the fuel utilization of heat units effected in the evaporation of water and the generation of steam.

The annual expense for fuel for locomotives on the railways of the United States at the present time is $200,000,000 in round figures. Therefore each 1 per cent. of loss is equivalent to a loss of $2,000,000, and efforts put forth to remove existing defects or the introduction of improvements which will eliminate waste will result in greater saving in the operating expenses of railways than in any other item of expenditure. It is amazing to contemplate the fact that only 45 per cent. of the fuel consumed is utilized in the boiler for effective work, or, in other words, that $200,000,000 is annually expended to produce $90,000,000 worth of effective work, or an efficiency of only 45 per cent.

The possibility of increasing this efficiency by a reduction in the elements of waste is interesting, and presents a promising field for investigation and experimentation.

*Item* 1. Stand by losses are not due to the locomotive itself, and can be controlled entirely by proper regulation in the roundhouse and by train despatchers in handling trains on the road. Good roundhouse practice and systematic ordering of engines at proper times for taking out trains and the prompt movement of traffic over the road by intelligent train despatching will effect a large saving in this item of loss. It is not unreasonable to believe that this item can be reduced 25 per cent., so that the loss will stand at 15 per cent. instead of 20 per cent., as under present average practice.

*Item* 2.—Losses due to evaporating moisture in coal are only controllable to the extent of securing coal with a low degree of moisture, but as this is not always practicable and fuel having other important elements must be used, it is unlikely that this item of loss will be reduced.

*Item* 3.—Losses due to coal wasted on ground and stolen may be reduced by not permitting the overloading of coal on engine tenders with resultant waste by falling off the engines while running. The loss due to theft may be regulated to a small extent by proper supervision. This item as a whole should be reduced at least 25 per cent., making the loss stand at 75 per cent. of what it is now.

*Item* 4.—Loss due to unconsumed gases escaping through the stack is one that can be largely reduced and offers one of the greatest possibilities for increasing the fuel efficiency in locomotive boilers. By the introduction of brick arches, baffles and the application of smoke box super-heaters, reheaters or feedwater heaters much of this loss can be stopped. Progress along these lines is being made, but much remains to be done. It should be possible to reduce this loss about 50 per cent., so that it will stand at 5 per cent. instead of 10 per cent.

*Item* 5.—Losses due to unconsumed fuel in cinders and sparks are an item of considerable importance and can be largely, if not almost entirely, eliminated. Increased grate area, improvement in flameways by the application of brick arches and other devices, and proper selection and preparation of fuel will reduce these losses by at least one-half, or to 5 per cent.

*Item* 6.—Losses due to unconsumed fuel in ashes resulting from fuel dropping through the grates into ash pans can be prevented by a proper design of grate. Proper methods of firing will also tend to reduce this loss at least one-third, or to 2 per cent.

*Item* 7.—Losses due to radiation and leakage of steam may be reduced by proper methods of insulation and attention to keeping all valves and steam connections tight. A reduction of at least one-third, or to 4 per cent. is possible.

*Item* 8.—It is astonishing that less than one-half the heat value of fuel is utilized in effective work in the boiler, the rest being dissipated in losses due to various causes as outlined above. Not all of the value of fuel that is utilized effectively in boilers is used in producing tractive power. A further loss is incurred by escaping steam from safety valves, cylinder cocks, injectors, bell ringers, blowers, oilers, etc. These uses demand a varying percentage of the 45 per cent. of the total fuel consumed, and while utilized in work incidental to the production of tractive power; nevertheless, some of it is dissipated in losses, such as the escaping of steam through safety valves and cylinder cocks, and needless application of blower, which altogether may represent a further loss of at least 5 per cent. There is not, therefore, more than 40 per cent. of the actual heat value of fuel in locomotives utilized to produce tractive power or the effective work of the steam locomotive. This means that while the total cost of fuel for locomotives is about $200,000,000, only $80,000,000 worth of effective work is secured from this expenditure, and $120,000,000 per annum produces no effective results. While, of course, 100 per cent. efficiency in this expenditure is not and never will be a possiblity, there is reason to assume from the foregoing analysis that from 20 per cent. to 25 per cent. of the losses now incurred may be eliminated, effecting a saving of from $40,000,000 to $50,000,000 per annum.

The second element involved in the waste of fuel on locomotives is the loss incurred through the negligence, ignorance and carelessness of enginemen.

So enormous is this waste that in some instances as much as 50 per cent. of the fuel fired on locomotives is absolutely lost. This fact was clearly demonstrated by a test run on the Lehigh Valley Railroad on June 21, 1911, a detailed report of which may be found in the issue of the *Railway Age Gazette* of July 28, 1911, on account of its practical bearing on this important subject it may be of interest to repeat the main facts here.

Passenger Train No. 4 Buffalo—New York Express leaving Buffalo at 9:58 a. m. with Atlantic type passenger engine 2475 was selected for the test. The train consisted of ten cars. Two cars were dropped at Bethlehem, 359 miles from Buffalo, one car was dropped at Boston, 370 miles from Buffalo, the remaining seven cars being handled through to Jersey City, 446.6 miles from Buffalo. The same locomotive with the same crew ran through the entire distance, an engine crew being taken on at Sayre to act as pilot over the division east of Sayre. The engine took water eight times, and sufficient coal was supplied at Buffalo to make the entire run. The total amount used was 30,070 lbs., or practically 15 tons. The fire was not cleaned or even raked during the whole run, and the grates were slightly shaken six times.

The performance of the locomotive, and the coal consumed per unit of service were as follows:

| | |
|---|---|
| Train miles | 446.6 |
| Car miles | 4,214.8 |
| Ton miles | 234,395.6 |
| Coal used per ton mile | 0.128 lbs. |
| " " " train mile | 67.33 lbs. |
| " " " pass. car mile | 7.134 lbs. |
| Shovels of coal at 14 lbs. each per train mile | 4.8 |
| Coal used on trip total | 30,070 lbs. or 15 ton |
| Miles run to one ton of coal | 29.70 miles |
| Coal per sq. ft. grate area per hour | 48.94 lbs. |
| Time of run | 12 hrs. 3 minutes |
| Actual running time | 10 " 40 " |
| Average speed | 41.8 M. P. H. |

The comparison between the coal consumption on the test run and the average for year 1910 is as follows:

| | Coal per train mile. Lbs. | Coal per car mile. Lbs. | Shovels per mile. No. | Total coal used. Tons. |
|---|---|---|---|---|
| Test run | 67.33 | 7.134 | 4.8 | 15 |
| Average 1910 | 132.2 | 24.4 | 9.4 | 25 to 30 |

This test clearly demonstrates what may be accomplished with extraordinary care in the firing of locomotive fuel, and shows a saving of nearly 50 per cent., as compared with the previous years' average record. It is not unreasonable in the light of this experience to expect a saving of at least 25 per cent. with ordinary care and the proper discipline and method to check the consumption of fuel and locomotive performance. If this is true, then it is possible to reduce the cost of locomotive fuel on

the railways of this country at least one-fourth, or $50,000,000 per annum.

It is remarkable that in view of the great possibility of economizing in railway operation in the single item of locomotive fuel, such crude methods are in vogue on most railways of keeping a check on fuel consumed and of working comparisons between the actual performance per unit of service and what should be a reasonable work per unit of service. Many railways have equipped coaling stations with scales to determine accurately by weight the fuel delivered to locomotives. Careful inquiry shows that in most cases little or no actual results have been secured from the weighing of coal, and many railway officials claim that scale weighing coaling stations are not a success and do not contribute to coal economy.

Direct issue is taken with these claims, and it is confidently asserted that if all coaling stations were equipped with scales and these scales kept in proper order, and a system of records were established whereby coal would be charged to each locomotive and the work performed recorded so as to determine absolutely the consumption per unit of service for each locomotive, a check would be established by which men could be held to accountability in this important item of expenditure. A particular railway which has determined on the policy of weighing accurately all coal delivered to locomotives and keeping a record of the individual performance of locomotives, anticipates a saving of at least 10 per cent. of the cost of fuel per annum as a result of this system alone.

The difficulty has been not that scale weighing coaling stations are unsuccessful, but that they have not been systematically and properly operated in the past. On most roads this is now left to ignorant and incompetent men, and is not systematically and faithfully followed up. Like so many things on a railway, the plan is only one-half perfected and, of course, fails of its proper accomplishment. To be successful in this matter, as in all others, there must be careful planning, fully covered by instructions, and the instructions must be obeyed, otherwise failure results.

There is great promise of economy in fuel for locomotives in the use of mechanical stokers. Several types of stokers have been in use for some time, but experience with them has been limited and many practical details remain to be developed before their use can be made completely satisfactory. Definite results have, however, been secured by their use, their advantage being the greater uniformity in distribution of fuel over the firebox area and the admission of proper quantities of air, resulting in more complete combustion of fuel.

The matter of expense of locomotive fuel is so important that it will warrant the adoption of a complete and scientific system governing fuel selection and purchase on the basis of the heat value of fuel, the accurate and systematic disbursement and accounting of all fuel used and a careful check on its consumption by individual locomotive performance and rigid insistence on the accomplishment of a predetermined reasonable result based upon known and definite results which are within the realm of reasonable accomplishment, making due allowance for varying conditions and contingencies.

This result can only be attained by a well organized fuel bureau or department, which shall be charged with producing actual and definite results. Any railway which will undertake this task will be astonished at the results secured.

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To meet the deficit in the operation of the Chilean state railways during the past year, the freight, passenger and baggage rates were raised by a decree of February 9, 1911. It was found, however, that this increase would produce a revenue considerably in excess of the actual deficit sustained, or any probable deficit that might occur. The department of industry has, therefore, modified the increased tariffs by reducing the freight rates on merchandise 30 per cent.; other rates remaining the same.

## RAILWAY BUSINESS ASSOCIATION DINNER.

The third annual dinner of the Railway Business Association was given at the Waldorf-Astoria, New York, last Wednesday night. The attendance, which was over 800, included, besides a large number of railway presidents and vice-presidents and heads of railway supply companies, a representative gathering of presidents of chambers of commerce and similar organizations, and officers of industrial companies other than supply companies.

The speakers were Governor Emmett O'Neal of Alabama; Walker D. Hines, chairman of the executive committee of the Atchison, Topeka & Santa Fe; A. C. Rulofson, president of the California Home Industrial League, and H. J. Pettengill, member of the executive committee of the Texas Commercial Secretaries' Association. President George A. Post of the association was toastmaster.

Among those present at the dinner were: A. A. Allen, of the Missouri, Kansas & Texas; William Barbour, of the Linen Thread Company; F. A. Bedford, of the Philadelphia Traffic Club; W. G. Besler, of the Central of New Jersey; O. P. Briggs, of the National Foundries Association; W. C. Brown, of the New York Central; George F. Brownell, of the Erie; B. F. Bush, of the Missouri Pacific; D. D. Caldwell, of Wells Fargo & Co.; John Claflin, of H. B. Claflin Co.; H. B. Clow, of Rand, McNally & Co.; H. P. Davidson, of J. P. Morgan & Co.; Frank H. Dixon, of Dartmouth College; Newman Erb; S. M. Felton, of the Chicago Great Western; W. W. Finley, of the Southern Railway; W. A. Gardner, of the Chicago & North Western; John M. Glenn, of the Illinois Manufacturers' Association; Frank Hedley, of the Interborough Rapid Transit; Francis L. Hinne; J. H. Hustis, of the Boston & Albany; E. T. Jeffery, of the Denver & Rio Grande; L. E. Johnson, of the Norfolk & Western; George Kittredge, of the New York Central; Julius Kruttschnitt, of the Harriman Lines; E. T. Lamb, of the Norfolk Southern; L. F. Loree, of the Delaware & Hudson; Wiliam G. McAdoo, of the Hudson & Manhattan; C. C. McCain, of the Trunk Line Association; S. S. McClure; Logan McPherson, of the Bureau of Railway Economics; Norman E. Mack; W. F. Mahl, of the Harriman Lines; F. O. Melcher, of the Chicago, Rock Island & Pacific; H. U. Mudge, of the Chicago, Rock Island & Pacific; W. T. Noonan, of the Buffalo, Rochester & Pittsburgh; George T. Oliver; W. L. Park, of the Illinois Central; E. Pennington, of the Minneapolis, St. Paul & Sault Ste. Marie; Ralph Peters, of the Long Island; Ira Place, of the New York Central; Sereno S. Pratt, of the New York Chamber of Commerce; W. L. Ross, of the Chicago & Alton; C. E. Schaff, of the Lake Shore & Michigan Southern; Jacob H. Schiff, of Kuhn, Loeb & Co.; J. M. Schoonmaker; C. M. Schwab, of the Bethlehem Steel Company; Isaac N. Seligman; Senator John C. Spooner; A. E. Stillwell, of the Kansas City, Mexico & Orient; E. T. Stotesbury, of Drexel & Co.; Isidor Straus; J. C. Stuart, of the Erie; J. B. Thayer, of the Pennsylvania Railroad; A. P. Thom, of the Southern Railway; William H. Truesdale, of the Delaware, Lackawanna & Western; Frank Trumbull, of the Chesapeake & Ohio; Roberts Walker, of the Chicago, Rock Island & Pacific; George Westinghouse; Daniel Willard, of the Baltimore & Ohio; W. R. Willcox, of the New York Public Service Commission; W. H. Williams, of the Delaware & Hudson, and Edwin W. Winter.

Abstracts of the addresses of Governor O'Neal and of Mr. Hines follow:

### GOVERNOR O'NEAL'S ADDRESS.

The law-making power should approach railway questions in no spirit of passion or prejudice, but with a mind free from bias or bitterness, seeking only to reach just and conservative conclusions in the important problems involved, and while fixing rates and other incidentals of public service to avoid carefully any crippling of these enterprises or any impairment of their ability to maintain a proper equipment for the public service and earn a fair return on the capital invested.

Like the powerful barons of the feudal ages some of the great

railway systems in former years fancied themselves grown equal to the sovereign power. These great interests became aggressive in their exactions, generating that public hostility which later flowered into laws that were perhaps in some instances unduly burdensome. The enforcement of these laws was responsible for an opposition to all the laws and the development of that new doctrine which denies the right of a state government to impose upon an interstate road any regulation of even its intrastate traffic. To deny to a state the right to regulate rates on intrastate shipments would be to enthrone the railway above the state or any other power, expose its citizens to an unrestrained and unlimited taxation for private gain and involve the destruction of sovereignty. Looking broadly to the general interests of society it would be better even for the railways to have unjust laws if there were no other alternative than to have the right of the state to regulate its internal affairs in this regard impaired or utterly destroyed. If the right to regulate intrastate rates reasonably does not reside in the state it resides nowhere.

Confiscatory rates made by a state are as bad as predatory rates made by railways. Under neither can there be that equality of opportunity which all our institutions try to preserve. I feel gratified that my own state, lately the theater of a desperate political struggle between the people and the railways, has through its dominant political party made a declaration of policy on which both the people and the railways can with justice to themselves and to each other stand:

"We favor legislation which will safeguard the rights of the public as against such corporations, but condemn any legislative attempts to cripple such corporations by enactments which are harsh, retaliatory or inspired by a spirit of hostility."

That same spirit of hostility was manifested in Alabama when a law was enacted which denied railway corporations under the threat of forfeiture of their charters the right to appeal from the state to the federal courts. I denounced such a law then as unconstitutional because it denied to foreign railway corporations engaged in business in Alabama the equal protection of the laws —a position which was subsequently confirmed by the United States court of last resort and which law during my administration was stricken from our statute books.

I am gratified to know that rebates have almost entirely ceased to exist, and that the discrimination which has heretofore largely been responsible for the hostile feeling that may once have existed has been to a great extent eliminated. There is no hostility on the part of the people of my section to railway corporations.

We recognize that in an undertaking so hazardous as the construction and operation of railways investments in these enterprises will cease if these corporations are restricted in their earnings to the limit of legal interest, and that a policy which would discourage railway building would not only be unwise but detrimental to the best interests of our section.

We fully recognize the marvelous work which the railways have done towards the development of the industrial interests of the country. We recognize that the presidents of the great transportation corporations and the railway map makers of the country have shown marvelous skill and genius. If mistakes have been made they were due to the folly of the state and nation in sitting with folded hands and not sooner exercising the power vested in them to protect the public. In insisting upon the sovereign power of the state to regulate intrastate rates we are not seeking to restrict the operation of railways, impede or check their growth or prevent fair and even liberal returns on their property.

### MR. HINES' ADDRESS.

The railways are in the hands of the government more than ever before and are steadily getting more completely into that position.

The rates which railway companies can charge are almost wholly controlled by the governments, federal and state. As a practical matter interstate rates cannot be increased without the consent of the Interstate Commerce Commission, and, generally speaking, must be reduced whenever the commission says so. There are commissions in about forty of the states, some with complete power and some with partial power to control intrastate rates. Almost always, when any commission, federal or state, proposed to reform any rate adjustment the reform is accomplished by reducing rates, and not by increasing them. A commission almost never sanctions any increase in a rate, and it is an almost everyday event for commissions to make orders necessitating rate reductions.

The operating expenses of the railways are being steadily increased through governmental action, for example, by reducing the hours of service of railway employees, increasing the size of the crews required to operate trains, increasing the liabilities of injuries to employees, and prescribing the compensation to be paid to injured employees. There is a marked tendency toward increase of legislation of this character. All such legislation tends to compel the payment of more money for the same service at the very time that the rates received for such service tend to be reduced by government action.

Moreover, the laws are requiring increased capital expenditures for more expensive cars, for more expensive stations, and for greatly increased expense with a view to promoting the public safety. Likewise, there is constant pressure of municipalities and of local public sentiment compelling railways to make enormous additions to their investments in the way of elevating tracks, abolishing grade crossings, providing more handsome stations and more comfortable service, all of which increases the investment without increasing the ability to pay a return upon it.

I am not criticizing these conditions. I am merely stating the facts. I want to emphasize that these governmental activities have converged to a place where very grave responsibility rests upon the governments, both federal and state. The upper and nether millstones are getting very close together. It is a grave duty of the government to prevent their coming any closer, and it is your duty and your interest to impress that fact upon those who make and enforce the laws.

I should say that pre-eminently it is your opportunity and your duty to urge upon the public officers of the country a sense of responsibility for the general situation. Too often one officer advocates a single policy which may reduce rates, or increase operating expenses and rates, and close their eyes absolutely to every other aspect, overlooking the fact that the situation has now reached a point where nothing can be done on any aspect of the question which does not affect the general situation as a whole. And further, on that point, one of the most effective ways to inculcate this sense of responsibility is to encourage the placing in a single tribunal of the various powers on this subject. So long as a commission may reduce rates, and has to give no thought to the question of operating expense, or capital investment, it is not likely to have a very lively sense of responsibility for providing the means for paying the operating expenses and for creating the additional capital. So long as legislators, on the other hand, can direct their attention exclusively to requiring increased operating expenses and increased capital investments, paying no attention to rates, saying that the commission will take care of that, there again we have a condition where a comprehensive and direct sense of responsibility is lacking. Since it has become the general practice in this country to place in the hands of the commissions, who are supposed to be thoroughly advised in the premises, the questions of railway revenue, and the rates the railway companies may charge, certainly it is wise for you gentlemen to encourage all public officers to adopt the policy that legislation restricting railway net earnings, through increased operating expenses, or through increasing the capital invested, ought not to be had except upon the recommendation of the commission, which presumably knows more about it than the legislature.

I believe that governmental agencies are coming more and

more to appreciate this grave responsibility, and I believe that there is gradually developing an appreciation of the central proposition that railway companies cannot properly perform their public service and raise the hundreds of millions of new money required to improve that service unless the margin between receipts and expenses is sufficient to pay an attractive return upon the existing investment and in addition to provide a substantial surplus to sustain the credit of the companies.

I do not believe you can render any greater assistance in the promotion of the public welfare than to stimulate in every public officer a clear appreciation that railway legislation has reached the point where the government has become in a very large measure responsible for the adequacy of railway service, and must live up to that responsibility in order to protect and promote the transportation service.

### BUSINESS MEETING OF THE ASSOCIATION.

The annual business of the association was held earlier in the day, meeting at the Waldorf-Astoria, New York, November 22. The report of the executive committee said, in part:

The Railway Business Association has no part in party politics. The ideal condition as we view it would be for all parties everywhere and always to declare so boldly for adequate railway earnings that the question would never be an issue between them. To that end we should exert our energy and influence and by directing our argument to all the parties alike we can, while retaining our independence, press our propaganda with the makers of platforms.

The part taken by the railway supply manufacturers [in promoting better relations between the railways and the public] has been accomplished by reasoning with their neighbors and securing their organized co-operation. That way lies future achievement. To business bodies let us appeal. We may now count on a quick and sure response from business men. They now have problems of regulation.

Through the first two years of our existence as an organization, we frequently found it desirable to make public appearances in the discussion of particular situations. During 1911, in the absence of occasions for that type of activity, we have been able to develop a kind of effort more fundamental and of greater permanent value. That work is the thorough study from time to time of some specific phase of public relations, resulting in the publication of a piece of vital, fresh information, illustrating our policy of conciliation, and disseminated in the form of a bulletin. . . .

The committee on Plan and Scope made recommendations, which were unanimously adopted, to enlarge the scope of the activities of the association by taking part in discussions on subjects other than regulation. The constitution was amended to make this possible and also to facilitate further amendments. The report of the Committee on Finance showed an increase in revenue of $5,000 over last year and a decrease in expenditures of $8,000 from last year, largely due to diminished activities in matters of legislation. The cash balance of the association increased $9,000 during the year. An index of the growth of the association is that at the dinner three years ago there were 250 places and at the dinner on November 22, 1911, there were 829 places. Officers were elected as follows for the ensuing year: President, George A. Post, Standard Coupler Company, New York; vice-presidents, H. H. Westinghouse, Westinghouse Air Brake Company, Pittsburgh, Pa.; W. H. Marshall, American Locomotive Company, New York; A. H. Mulliken, Pettibone, Mulliken & Company, Chicago; A. M. Kittredge, Barney & Smith Car Company, Dayton, Ohio; O. H. Cutler, American Brake Shoe & Foundry Company, Mahwah, N. J.; W. E. Clow, James B. Clow & Sons, Chicago, and George W. Simmons, Simmons Hardware Company, St. Louis, Mo.; secretary, F. W. Noxon; treasurer, C. A. Moore, Manning, Maxwell & Moore, New York; and assistant treasurer, M. S. Clayton, Manning, Maxwell & Moore.

## SOUTH MANCHURIA RAILWAY.*

In August, 1905, the Japanese government acquired, by the treaty of peace between Russia and Japan, the main railway line from Changchun, Manchuria, to Port Arthur, together with the branch lines and other properties. The South Manchuria Railway Company was formed to take over these lines and properties from the government. The authorized capital of this company is $100,000,000. The Japanese government owns half of the total authorized capital, which is its share for handing over to the company the complete railway lines in Manchuria with the properties belonging to them and the coal mines of Fushun and Yentai, with a total assessed valuation of $50,000,000. The other $50,000,000 capitalization was made available by subscription to Japanese and Chinese subjects only. The shareholders are guaranteed a dividend of 6 per cent. a year by the Japanese government. The first issue of shares was limited to $10,000,000, of which only $1,000,000 was fully paid for. There remains, therefore, $40,000,000 stock not yet issued and $9,000,000 subscribed to but not yet fully paid for. Both the president and the vice-president of the company are appointed by the government, as are the directors, who, however, must own at least 50 shares of the company's stock.

On April 1, 1907, the company took possession of and commenced operations on the following lines, which constitute the investment of the government: The main line between Dairen and Changchun, 437½ miles; the line from Nankuanling to Port Arthur, 39 miles; Tashihchiao to Yinghou, 13 miles; the Yentai branch line, 9¾ miles; the line from Suchiatun to Fushun, 39 miles; and the Antung-Mukden line, 189 miles. With the object of raising the funds required for the reconstruction of these lines, as well as for subsidiary undertakings, the company has up to the present issued in London three separate issues of 5-per cent. debentures amounting in all to $40,000,000, both capital and interest being guaranteed by the Japanese government.

The gage of the railways, when acquired from the government, was 3 ft. 6 in., with the exception of that of the Antung-Mukden line, which was only 2 ft. 6 in. The company immediately commenced to change the gage to the standard of 4 ft. 8½ in. on all lines, except the Antung-Mukden line, and completed the work without interruption to traffic. The track between Dairen and Suchiatun, a distance of 238½ miles, was doubled. Traffic on the standard gage was opened on the Port Arthur line in November, 1907, and on the entire main line in June, 1908. In spite of many adverse circumstances and difficulties due to the war, the engineers had succeeded in widening the gage on more than 500 miles of railway in one year.

In order to improve the through traffic between Europe and the Far East, the company inaugurated in October, 1908, an express service between Dairen and Changchun, consisting of Pullman sleeping and dining cars of the latest type. The express trains run three times a week and connect Changchun with the Siberian trains of the International Sleeping Car & Express Train Company and the Russian State Express. At Dairen the expresses connect with the steamship service operated by the company between that city and Shanghai twice a week. An agreement has been made with the Japanese government railways, the Osaka Mercantile Steamship Company and the Japan Mail Steamship Company regarding through transportation of cargo. This was put into effect January 1, 1911, simultaneously with the through freight traffic between Shanghai and the principal stations on the South Manchuria Railway. By virtue of these arrangements exceptional facilities are now obtained in through cargo transportation, at this company's principal stations, to many ports in the East, as well as in Europe, Australia and America.

The reconstruction of the Antung-Mukden line to standard

*Abstracted from the *Far Eastern Review.*

gage was begun in August, 1909, and 35 miles were opened to traffic on November 3 of the same year. On November 3, 1910, the line was opened from Antung to Chikuanshan. In regard to the remaining section from Penhsihu to Chikuanshan, 73 miles, in spite of the great engineering difficulties that are constantly being met with, it is expected that the work will be completed by March, 1912. The Yingkon branch, which formerly had its terminus at Niuchiatun, has been extended as far as the new Japanese town of Yingkon, where a new station was built and opened to passenger traffic in November, 1909, and where the old station is being used as a freight office. The reconstruction of the Yenti branch line, which became necessary in consequence of the increased output of the Yenti coal mines, was also completed, and on March 1, 1910, freight trains began to run between Liaoyang and the mines.

The reconstruction of all the railways compelled the company to dispense with the narrow gage rolling stock, which was therefore sent to Japan in 1908. This equipment included 217 locomotives, 3,727 freight cars and 157 passenger cars. The rolling stock in use in June, 1910, included 298 locomotives, 2,965 freight cars and 179 passenger cars.

Originally a central railway work shop had been erected in Dairen for constructing, repairing and rebuilding rolling stock, not only to meet the requirements of the company, but also those from outside. Besides this central work shop other smaller ones were built which, however, were found incapable of meeting the demand. It was therefore decided to build a fully equipped shop at Shahokou, near Dairen, which is now nearly completed. This shop will have a capacity of repairing 20 locomotives and 46 freight cars at the same time. The company also intends to improve the other shops.

The passenger traffic has increased from 1,512,231 passengers in 1907 to 2,179,062 passengers in 1909. The freight traffic has increased from 1,486,434 tons in 1907 to 3,568,527 tons in 1909. In 1907 the gross earnings were $4,884,444, and the expenditures were $3,050,807, and in 1909 the gross earnings were $7,508,099 and the expenditures were $2,909,167.

The company instituted a regular steamship service between Dairen and Shanghai by chartering a steamer. This service was opened August 10, 1908, and connects with the shortest and quickest route from Europe to Shanghai. It is important for passenger and freight traffic, as well as for mails. In May, 1909, a second steamer was chartered so that now there is a semi-weekly service between Dairen and Shanghai.

The Fushun coal mines are about 22 miles east of Mukden. It is estimated that they contain 800,000,000 tons of coal, and the daily output has recently been increased to 3,000 tons. In order to meet the demand for gas the company has established works at Dairen with a productive power of 280,000 cu. ft. The company has also been very active in building new towns and improving old ones. Parks have been created in Dairen and three other important places; agricultural experimental stations have been established, as well as markets, cemeteries and other improvements. The total area of land belonging to the railway amounts to 46,000 acres, all of which is offered for lease with the houses erected upon it, with the exception of those parts occupied by the military and civil departments of the government. Hospitals have been established at all the most important points, where treatment is extended not only to officers and employees, but also to all residents. Schools have been established by the company along its lines, and in September, 1910, the total school attendance was 1,380.

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On the Amur Railway, Siberia, about 60 per cent. of the earthwork is done. Ninety per cent. of the dwellings have been erected and all the bridges have been completed. On the Central Amur Railway the preparatory work is finished. There are no contractors and all the work is being done by the government, largely by convicts. Dwellings with baths, restaurants, etc., have been built. The workmen are paid $21.25 to $31.84 a month; and quarrymen $2.65 a day.

## RAILWAY SHARE CAPITAL.

BY WILLIAM Z. RIPLEY,

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The capital stock of a railway, in contradistinction to its bond issues which stand for indebtedness, represents ownership and responsibility for management. This capital is divided into shares, usually of a par value of $100 each. Theoretically this par value is presumed to represent an actual investment of funds in the enterprise; and the total capital stock, together with the bonds, is supposed to equal the aggregate assets of the company. But in practice there is no such relation at all; as the wide range of market quotations for stocks above and below par readily proves. The stock may, in fact, have had no value at all at the outset save for purposes of management and control. Nevertheless, the existence of this par value, stated upon the face of each certificate, serves two very important purposes. It defines the basis upon which earnings are distributed in the form of dividends; thus enabling the public to measure the relative profitableness of operation. And in the second place, it roughly defines the liability of each shareholder in case of failure or fraud. It is of the essence of the corporate form of organization that this liability shall be limited to the amount of the investment. Each holder of a share stands to lose its cost to himself; but he cannot be called upon further to satisfy the claims of creditors, as might the partner in a business concern. This is the principle of "limited liability," which on a large scale has made possible the co-operation of many scattered investors in complicated enterprises.

The stated par value of each unit of share capital, then, supposedly represents an amount actually invested in the enterprise. This supposition may assume concrete form in the case of shares, which at issue were only in part paid up; which were, in other words, emitted without a corresponding enhancement of the company's assets. These assets are the sole security of creditors, primarily bond holders. And unless these assets at least equal the face of the indebtedness, the bond holders are bound to suffer. From this circumstance flows the long standing rule in Massachusetts and other states, prohibiting any issuance of evidences of indebtedness greater than the amount of capital stock. But the principle that the capital stock is a trust fund for the benefit of creditors may go even farther than this. If the full face value of shares was not paid up, as it was asserted to be,—that is to say, if the assets do not equal the capital stock,—the shareholder may be called upon to make up the unpaid balance. The necessity of this important rule in exceptional cases may be shown by a concrete example.

About 1888 one Harper owned a narrow gage railway in Ohio, about 20 miles long. This had never even earned operating expenses, and was acquired practically for the value of scrap iron. It was subsequently described as badly built, with heavy grades, narrow cuts and fills, only temporary bridges and very light rails. Harper proceeded to organize the Cincinnati, Columbus & Hocking Valley Railroad Company, capitalized for $600,000 in stock and $1,200,000 in bonds. He personally subscribed for 2,500 of the 6,000 shares, no cash, however, being paid in. To this company he delivered his narrow gage road in exchange for the bulk of its securities, and then turned over part of the bonds thus received to various contractors for extending the line to larger towns at each end, and for making it a standard gage road. How thoroughly this was done appears in evidence, among other things, to the effect that the new rails were merely spread out on the old narrow gage ties. There were no stations, no water tanks, and there was no business. It was "probably worth for scrap $2,000 per mile, or, as a railway, $4,000, or for 28 miles, say $112,000, for which Harper received $1,670,000 in securities." The bonds not exchanged for work done were publicly sold. The company failed, of course. The unsatisfied creditors sued Harper for the par value of his 2,500 shares, taken on subscription, but not paid for. And the Federal court

held the claim good; viz., that Harper as a stockholder was liable for full payment in money at par or its equivalent, in view of the fraudulent nature of the transaction.

The foregoing extreme case of fraudulent over-valuation of a company's assets in connection with the issue of its stock shows the danger lurking in the recently advanced proposition to abolish the par value of share capital altogether. This proposed elimination of the "dollar mark" is advocated by most eminent counsel. It has been endorsed by the New York Bar Association, and incorporated in a bill passed by the New York legislative Assembly in 1909. Much testimony in its favor has been recently presented to the Federal Securities Commission created under the Mann-Elkins Act of 1910. Each share instead of theoretically at least standing for $100 paid in, would become a "certificate of participation" in earnings. Dividends would be declared, not in a percentage of capital stock, but as a fixed sum of money per share. The proposal while legislatively pushed, both in New York and New Jersey as a remedy for the overcapitalization of business corporations, has already been adopted by public service companies elsewhere. Street railway lines in Massachusetts, organized as voluntary associations, have employed it. The United States and Adams express companies have no par of stock, but issue "interests" or "shares of interest," as they are termed. The Great Northern Railway iron ore properties in 1907 were thus financed and set apart. It has been proposed to reorganize the surface trolley lines in Chicago in a similar way. The proposition, while from the standpoint of private finance seeming to safeguard investors against fraud, is vicious in the extreme as applied to common carriers or other public service companies. It releases the promoter from any positive liability for overcapitalization. There being no par value, there is no obligation to pay in any stated sum per share. The equivalence of assets and capitalization which ought to obtain in the case of any company holding valuable rights from the public, becomes non-existent. And what is of equal importance, all standards by which to readily measure the reasonableness of the general scale of charges disappears.

### PREFERRED STOCK.

Originally all railway shareholders were equal in respect of their rights and obligations. At a later time, possibly in imitation of the early English practice of splitting stocks into "preferred" and "deferred" shares, the American roads began also to divide their capital stocks into classes. The simplest device was to create a preference as to dividends upon a relatively small part of the stock, leaving to the so-called common shareholders whatever balance might be left. By reason of this preference one would suppose that the preferred stock would command a much higher price than the common shares. But this need not be so. For usually there is coupled with the preference as to dividends, the further provision of limitation of the rate of return to a fixed percentage. Thus the Union Pacific Railroad has outstanding $100,000,000 of preferred stock, limited in return, however, to 4 per cent. Nor is this 4 per cent. return cumulative in this instance. If not earned in any given year, the deficiency does not become a charge upon earnings of subsequent years. As a result, the market value of the preferred shares is most stable; but at a far lower price than the common stock commands. All surplus earnings over and above the preferred 4 per cent, going to the ordinary shares, gives the latter a peculiar, albeit a speculative, value. This arises, of course, from the fact that it is the residuary legatee of all future increments of revenue. As between two railways having equal share capitals, and being otherwise similarly circumstanced, except that one had split up its capital into common and preferred sorts, while the other had not, one would expect wider price fluctuations for the common stock of the former than of the latter. Fluctuations in earning power in other words would be focussed upon a smaller base.

The nature of the preference accorded to one class of shares may be of many sorts. Sometimes, as on the Chicago, Milwaukee & St. Paul, both classes of stock share alike after the first preference is met. In other cases, as on the Chicago & North Western, the 7 per cent. preferred shares are entitled to an additional 3 per cent. preference, after the common shares have received 7 per cent. Not until 10 per cent. is thus paid upon the preferred may any additional dividends be declared upon the common stock. The Seaboard Co. limited the non-cumulative feature to a period of five years, ending in 1910. The Reading Company, by reason of repeated reorganizations, has a still more complicated arrangement. There are two classes of preferred shares ahead of the common stock, both 4 per cent. non-cumulative. After 4 per cent. has been paid for two consecutive years on the first class, the second may be converted into common and first preferred stock in equal parts. A provision of great importance is the division of voting power between different classes of shares. The Wisconsin Central charter entitles the preferred shareholders to elect a majority of the directors in case of failure to pay the full prescribed dividend for two years in succession. This right is at all times vested in the relatively small amount of preferred shares of the Rock Island Company. The common shareholders have practically no voice in the management at all. The same thing is true of the New York, Ontario & Western. Probably the most complicated scheme of all was the mode of financing of the old Chicago Great Western. This followed the English practice, with no less than four distinct grades of preference in its capital issues.

Yet another feature of importance respecting preference in share capital has to do with the relative lien on assets. This issue usually arises in cases of bankruptcy or reorganization; but as in the attempted segregation of Union Pacific investments in other roads in a separate holding company after 1908, the preferred shares were a source of trouble. The matter should, of course, be made clear in the charter. Yet many controversies have arisen in this regard, notably on the Baltimore & Ohio and Northern Pacific roads. Does a preference as to earnings imply or confer a preferred claim upon the assets in case of foreclosure? Especially is this difficult to determine, where, as on the Northern Pacific road, the preferred shares were exchanged in reorganization for old bonds which were direct liens on landed property. In other words, the nice issue is raised, as to the distinction between preferred share capital and income or other bonds. Where both are accorded preference both as to earnings and assets, the two kinds of securities are practically identical. A peculiar instance of preferred stock may be mentioned in this connection. Many railways have only one class of share capital, all being common stock. The Great Northern has only one class, but it is all preferred. No common stock has ever been issued. This peculiarity is due to a charter right dating from 1865, which authorized the issue without limitation of such classes of preferred shares as it deemed proper. Under this charter the company claims exemption from state supervision of all capital issues of a preferred sort, and carefully refrains from any emission of common stock at all. The Rutland Railroad, also, since its reorganization in 1900 has 98 per cent. of its capital stock in the form of preferred shares. These shares are cumulative with reference to dividends; and now in 1911 are said to carry nearly 200 per cent. of dividends due, as a heritage from its checkered past.

Complicated provisions as to retirement or conversion of special classes of shares are not infrequent. The Southern Pacific preferred shareholder might convert his holdings into common stock after 1905; and the company might redeem them at $115 for five years after 1910. This issue was in many respects analogous to a convertible bond with a sinking fund provision. Ho wembarrassing some of these details may become, was well illustrated in the Northern Securities imbroglio in 1901. The outcome of the spectacular buying campaign for control of the Northern Pacific road between the Harriman and Hill interests finally resulted in the ownership by Harriman of a majority of about $1,000,000 in the total capital stock of the company.

But this majority was principally in the preferred shares. The Morgan-Hill party controlled a clear majority of the common stock; and at the time dominated the board of directors. Harriman control, however, despite ownership of a majority of the total capital, was thwarted by a retirement clause applicable to the preferred stock. Thus the control of the entire property depended upon the exercise of this retirement privilege on any January 1st prior to 1917. Normally the Harriman party would have assumed charge at the annual meeting in October; but this could be prevented by postponement of the election of new directors until after the first of the new year, when the preferred stock became subject to retirement. It was a complete deadlock, resulting in truce and subsequent compromise between the contending parties.

On the whole, it would appear that differentiation of share capital is more common than it used to be. Preferred shares amounted to about one-seventh of the total capital stock of American roads in 1890. This proportion reached a culmination in 1898, when about 27 per cent. of total capitalization was preferred. This, as will be seen, was a direct outcome of the widespread reorganizations incident to the panic and depression of 1893-'7. It was also in part probably connected with the financing of new railway consolidations. Since 1900 the proportion of preferred shares has tended to decline; amounting in 1908 to only about one-fifth of the aggregate share capital of the railways of the country. Normally it may be expected not to deviate widely from this proportion.

Among the reasons for creating a preference in the share capital of a company, the original one was probably in part sentimental. A new enterprise could be made a dividend payer from the outset by concentrating the first revenue upon a small proportion of preferred stock. The English practice is surely in part due to this reason. Regular dividends even upon only a portion of the total capital, considerably enhance a company's credit and its reputation among investors. A second reason for issuance of preferred stock was to raise new capital for extensions or improvements. Possibly the condition of the money market may be such at times as to preclude borrowing; that is to say, issuing bonds or notes. Or, as under the laws of many states, the bonded debt may already fully equal the capital stock, so that further borrowing is precluded. Moreover, the issue of new shares may be preferable, as they do not create fixed charges, to become an embarrassment in periods of depression. But the preference clause must be added in order to appeal effectively to conservative investors. Such was undoubtedly the motive in the financing of the Southern Pacific Company in 1904. Called upon to repay large advances for improvements by the Union Pacific, it could not issue bonds. Nor could it issue new common stock at the market price of $45 per share then prevailing. No other course than the issue of preferred stock was open. Five years later, surplus revenues having increased, the entire issue was retired at $115 per share. This provided a substantial bonus to those original shareholders who had come forward to aid the company when the issue was put forth. And temporary financing was effected without increasing fixed charges. This was the issue, by the way, concerned with the notorious Keene stock market pool, elsewhere described.*

A third and most important cause of preference in share capital has to do with financial reorganization. Bankruptcy is occasioned by inability to meet fixed charges; that is to say, interest upon funded or current obligations. It may be brought about by temporary causes, such as the industrial depressions of 1893 or 1907. The natural growth of business may ultimately bring increased revenues sufficient to cover such imperative needs; but time is necessary. On the other hand, the bondholders with prior liens upon the assets, are in a position to dictate terms to the stockholders, who stand to lose all in foreclosure proceedings. A fair compromise would seem to be to accord preference as to future earnings to those whose claims as bondholders must first be satisfied. The new company, by the exchange of part of its funded obligations for preferred stock, is relieved for the time of an undue burden of fixed charges; and surplus earnings as they emerge go to those to whom they rightfully belong. This practise, now widely approved, was not so general before 1893. But six of the seven most important reorganizations within the succeeding four years of depression, made use of the plan. An important feature, intended for the protection of the preferred shares, thus created, was a prohibition of the issuance of other bonds ahead of the new stock. But by such a combination of issues, the old bondholders are given rights to such earnings as may accrue up to the limits of the return to which they were entitled by their former holdings; and yet the common shareholders very properly reserve to themselves all increments of revenue over and above this amount.

Preferred shares not only may arise out of disintegration of railway properties through reorganization. They may also be an outcome of consolidations. The two properties to be joined, may be of very unequal earning power. They may also possess assets of widely different value. One may be a great present earner; the other may have valuable franchises or potential earnings in future. It is to the interest of both to combine. The shareholders must come in, if at all, on different terms. The simplest device is to accord a preference as to dividends to the one class, and indefinite possibilities of future profit to the other. The issuance of preferred shares completely solves such problems. The fifth and final reason for preferred stock issues, has already been mentioned. It may be an expedient for concentration or retention of control, with a minimum amount of investment. Such concentration may of course be as effectively applied to the common stock. In the Hudson Companies, which control the North river tunnels, all voting power is vested in $5,000,000 of common stock, while $16,000,000 of preferred shares are a nonentity in management. Legitimate enough, as used to safeguard the interests of former bond holders after a reorganization, as employed by the Wisconsin Central or Ontario & Western; such a device, as used in the Rock Island Company is most prejudicial to common stockholders. Fortunately the experience of this latter company shows it to be a plan which largely defeats its own end. Any large class of stock, deprived of its voting rights, may be expected to make little appeal to the investing class.

*Speculation in Railway Securities, in *Quarterly Journal of Economics*, February, 1911, p. 204, *et seq.*

## COST OF TRANSPORTATION ON THE ERIE CANAL AND BY RAIL.*

In the wide discussion regarding canals and inland waterways in this country during the past few years, little attention has been directed to the total cost of canal transportation. The term "total cost" is here used to cover not only the immediate cost of conveying goods, but also the cost of maintenance of the canal, cost of ordinary repairs, and fixed charges, dividends, and depreciation charges, if any.

Freight rates via the Erie canal are frequently contrasted with freight rates via railway, but as they comprise only the immediate transportation cost, that is, the direct charge for conveyance alone, they are hardly comparable with railway rates, which provide the revenue from which must be met not only the cost of conveyance, but also fixed charges upon the capital invested in the plant and the expense of maintenance of plant and equipment. All tolls on New York state canals were abolished in 1882, and the canals since that date have been maintained and operated at the expense of the state for the free passage of boats. Thus the only charges made against a shipper of goods by canal are those of the boatman who handles the goods, and

*From Bulletin No. 21, Bureau of Railway Economics, Washington, D. C.

these charges do not help to pay for the maintenance of the canal or for repairs. From the shipper's point of view a canal rate of two mills a ton mile is unquestionably preferable to a railway rate of six mills, if speed and convenience of handling are not as important to him as a low rate. It will be shown, however, that from the broader point of view of the community the railway rate, although apparently higher, may not actually be so. The maintenance and fixed charges on the canal, which are borne by the community, may amount to more than the difference of four mills per ton mile, which is the immediate saving to the shipper. This raises the question whether the burdening of the entire community for the benefit of the shippers, who constitute only a portion of it, is justified. But leaving this question aside, a fair comparison of the cost of transportation by canal and by rail should certainly be of aggregates that include every element in those respective costs.

This study is an effort to estimate the total cost of transporting a ton of freight one mile on the Erie canal at the present time, and to compare that cost with typical or average railway ton-mile freight receipts. To reach an estimate of transportation cost on the Erie canal, it has been necessary to ascertain three items in that cost: first, fixed charges on the canal, or cost of capital; second, cost of maintenance; third, immediate cost of transportation. The sum of these three items will give, fourth, the total cost of transportation.

The Erie canal is a product of state enterprise, paid for from funds obtained for the most part through loans made by the state of New York. These loans have to a large extent been repaid, partly out of the revenue from the canal and partly from sinking funds established and built up through taxation. Because of this liquidation of the canal debt, interest charges paid by the state on behalf of the canal have till recently been comparatively small. The canal represents, however, the investment of the people of the state of New York in a transportation plant, just as a railway represents an investment on the part of its stockholders and bondholders. In ascertaining canal transportation costs that shall be strictly comparable with railway transportation costs, it will therefore be necessary to arrive by some method at the physical value of the Erie canal today and on that value compute fixed charges, representing interest on the investment and depreciation.

But how estimate the value of the canal? There are two ways: first, to take the total cost of construction and permanent improvements to date or, second, to make a physical valuation of the whole canal property. Clearly, it is impossible to value the property without a careful appraisal. The statement so frequently made during the New York state canal campaign of 1903 that the Erie canal, as it stood, was worth more than the total amount expended on it since its inception, cannot be accepted without proof, especially as value depends so definitely on performance. The canal is not of value except as a canal, and as a canal is valuable only in proportion to the service rendered by it. It is feasible, however, to ascertain the total cost of construction and improvement of the Erie canal as a measure of its present value.

Complete official data showing the cost of the Erie canal to 1905, the year when work on the new barge canal was commenced, are not available. The canal autditor of the state of New York, in his annual report for 1882, stated the total cost to that year as $49,592,000. From 1882 to 1905 a number of special appropriations were made by the New York legislature for the purpose of improving the state canals, chiefly by deepening the channels and lengthening the locks. Among these appropriations was one of $9,000,000, made in 1895 for the purpose of increasing the lock capacity and depth of the Erie, Champlain and Oswego canals. Of the amounts spent under the latter appropriation up to July 15, 1898, more than five-sixths, or $6,787,000, was expended on the Erie canal.* What proportion of the other appropriations was applied to the Erie canal it is not possible to ascertain, but the share of that canal in the total was considerably over one-half. The Greene committee estimated that the cost of constructing and improving the Erie canal down to 1896 had amounted to $56,165,000.† It is probable, therefore, that Hepburn's estimate of $57,600,000‡ as the total cost to 1905 is well under the truth. On the basis of $57,600,000, the cost of the Erie canal up to 1905 was $163,600 a mile, which may be compared with the cost of road per mile of the four main trunk lines between Buffalo and New York: the New York Central, the Erie, the Lackawanna, and the Lehigh Valley. The cost of road per mile of these railways, according to the reports made to the Interstate Commerce Commission for 1905, was as follows:

| | |
|---|---|
| New York Central | $181,250 |
| Erie | 292,970 |
| Lackawanna | 90,240 |
| Lehigh Valley | 60,490 |
| Average | $212,716 |

Canal construction is far more expensive than is ordinarily appreciated, as is seen from the foregoing comparison:

It will now be possible to estimate the total cost of transportation on the Erie canal, made up of three items already enumerated: cost of capital, cost of maintenance, and immediate cost of transportation.

First. *Cost of Capital:* Taking 4 per cent. as the rate of upkeep on the Erie canal—an item intended to provide for interest charges and for extraordinary repairs and depreciation—and using a conservative estimated value of but $55,000,000 for the canal at the present time, instead of the $57,600,000 cited above, we have a total annual fixed charge of $2,200,000. This amount will be apportioned per ton mile of canal traffic in 1909 in a later paragraph.

Second. *Cost of Maintenance:* The cost to the state of New York of maintaining the Erie canal in 1909, according to data contained in the annual report of the superintendent of public works of that state,** amounted to $672,105. This amount is ascertained by adding to the $500,551 of operating expenditures and ordinary repairs a proportion, obtained by pro-rating on the basis of comparative expense, of the total general and division expenses of the canals of the state. This added charge covers administrative and supervisory expenses. The reduction of this item of maintenance to a ton-mile basis will be made shortly.

Third. *Immediate Cost of Transportation:* This is composed of boatmen's charges for conveyance. Canal boat rates vary considerably with the season, the condition of traffic, and the attitude of the boatmen. There are so few owners of boats on the Erie canal at present that they can regulate boat rates practically at will. The actual cost incurred by the boatmen in conveying wheat on the Erie canal was estimated by the Greene committee of 1889†† at 1.75 mills per ton mile. This estimate covers interest at 5 per cent. on investment in boats, all expenses for wages of boathands, and repairs, deterioration, and insurance on boats, without allowance, however, for profit to the boatmen. The average rate on wheat from Buffalo to New York during the season of 1909 varied from 2.07 mills per ton mile¶ in July to 3.33 mills in October and November; and on corn from 1.87 mills to 3.07 mills. The average for the season was 2.60 mills per ton-mile on wheat and 2.35 mills on corn. These rates differ by less than one-half of 1 per cent. from the average of the rates reported by the superintendent of public works for the years 1900 to 1909, and may therefore be considered as representative. The foregoing rates and estimates apply to grain only. For all commodities moved on the canals of New York state, the average ton-mile rate between 1903 and 1907 was 2.00 mills.§ An estimate of 2.00 mills for the average ton-mile rate on the Erie canal today would therefore seem to be a reasonable one. This represents the immediate charge for conveyance.

*Report of Committee on Canals of New York State, 1899, p. 162. This committee is commonly known as the Greene committee.

†Report, p. 153.
‡A. Barton Hepburn: Artificial Waterways and Commercial Development, p. 100.
**Report for 1909, pp. 31-39.
††Report of Committee on Canals of New York State, 1899, p. 57.
¶Ascertained by reducing the through rate per bushel to a ton-mile basis.
§Hepburn, p. 104.

Fourth. *Total Cost of Transportation:* Of the three components of transportation cost so far discussed, two have been gross amounts for the Erie canal as a whole, while only the last is expressed in terms of ton-mile traffic. To reach a figure of total cost per ton per mile it will be necessary to ascertain the total ton mileage of the traffic on the Erie canal in 1909, and reduce the first two amounts to a ton-mile basis.

Unfortunately, no ton-mileage figures are reported for the canal traffic in New York state at the present time. It will be necessary to make an estimate for the Erie canal based upon the reports of tonnage carried. The total number of tons of freight carried on the Erie canal in 1909 was 2,031,307. What proportion of this was through freight was not reported, but if the proportion was the same as in 1908, then 436,731 tons consisted of through freight, and 1,594,576 tons of way freight. If we assume that way freight was carried an average of half the length of the canal, or 176 miles—which is a liberal assumption—and that all the through freight was carried the whole length of the canal, or 352 miles, we have a total ton mileage of 435,000,000 for 1909.

On the basis of 435,000,000 ton miles of traffic in 1909, the fixed charges or cost of capital, $2,200,000, were equivalent to 5.06 mills per ton mile; and the cost of maintenance, $672,105, to 1.55 mills per ton mile. The total cost of transporting one ton of freight one mile on the Erie canal in 1909 was made up, then, of the following items:

| | |
|---|---|
| Cost of capital | 5.06 mills |
| Cost of maintenance | 1.55 " |
| Immediate cost of transportation | 2.00 " |
| Total | 8.61 mills |

Thus there is obtained a total charge for canal transportation of 8.61 mills per ton mile, directly comparable with a railway freight rate. What railway freight rate or receipt shall be quoted in comparison with this 8.61 mills of canal cost? By the four principal railways running between Buffalo and New York freight receipts per ton mile in 1909 were reported to the New York State Public Service Commission as follows:

| | |
|---|---|
| New York Central | 6.2 mills |
| Erie | 6.1 " |
| Lackawanna | 7.4 " |
| Lehigh Valley | 6.4 " |

Whichever one of these various railway average receipts per ton mile be taken, the cost of transportation on the Erie canal will be found to exceed it by from 16 to more than 40 per cent. Even when compared with average railway receipts for the whole United States, the Erie canal cost of transportation is considerably the higher. Thus average freight receipts per ton mile in 1909, for all the railways of the United States, amounted to 7.63 mills, as compared with 8.61 mills of cost on the Erie canal. For specific commodities the result is similar. The Interstate Commerce Commission reports that average railway freight receipts in 1909, for four of the commodities which make up a large part of the Erie canal traffic, were as follows:

| | |
|---|---|
| Grain | 6.11 mills |
| Lumber | 7.70 " |
| Anthracite coal | 6.03 " |
| Bituminous coal | 5.12 " |

None of these averages, it will be observed, is as high as the average cost of transportation via the Erie canal.

All this is true despite the very conservative estimates in making up the figures for the Erie canal—and this conservatism is worthy of special emphasis. Thus the ton mileage estimate used is probably too large, and the ton-mile canal rates based on that estimate are correspondingly low. In the opinion of the statistician to the New York superintendent of public works, the average length of haul of way freight over the Erie canal is not over 100 miles, yet the estimate here adopted is 176 miles. Again, 4 per cent. is a conservative rate for depreciation and interest. The stock and bonds of all the railways in the United States in 1909 had an average dividend and interest rate alone that exceeded 4 per cent., and an allowance of 4 per cent. for both interest and depreciation charges in connection with the Erie canal, is, in comparison, clearly a minimum. Finally, the estimate of value of the Erie canal property used in the computation is considerably lower than the estimates of the Greene committee and of other careful students of canal history.

Another fact that must be recognized in a comparison of railway and canal transportation costs is that the grade of goods shipped via canal is far inferior to that shipped via railway. The goods sent by canal are bulkier, coarser, of less value, and naturally are carried at a lower average rate. Of the tonnage carried over the New York canals in 1909, for example, nearly a third (31.8 per cent.) consisted of stone, rock, lime and clay; another third (36.6 per cent.) consisted of coal, iron ore, pig iron, boards, timber, pulp wood and wood pulp; while a fifth (21.2 per cent.) was made up of grain, ice and salt. It is clear that an average railway freight rate based only on such articles as were carried by the Erie canal in 1909 would be lower than the average freight rate on all articles carried by railways. The computations made above, therefore, result in an average canal rate lower than if the grade of articles carried by the canal averaged as high as on the railways. Notwithstanding this, the average canal rate, as has been shown, is actually higher than the highest average railway freight receipt quoted.

One cause of the high cost of transportation on the Erie canal is the fact that the canal remains idle so large a part of each year. The average length of the canal season is 223 days, or about 7½ months. During the remainder of the year the plant and the boats lie practically idle, although all of the general and many of the maintenance expenses continue without change. In the estimate of the Greene committee regarding the actual cost of transportation, allowance was made for this period of idleness by computing all expenses on the basis of only seven round trips a year—a full load on the down trip and a third of a full load on the return. But in estimating depreciation and interest charges no such allowance can be made—the plant is in existence and must be maintained, whether in operation or not. Whether or not this long period of idleness each year on the part of the canal is responsible for a large or a small part of the greater cost of canal as compared with railway transportation, it is an inherent feature of canal business in the state of New York and must be taken into account when comparing the canals and railways of that state.

This study has been limited to the Erie canal of today, all the statistics being based on past performances of record. The people of the state of New York are now engaged in spending more than $100,000,000 in the enlargement and improvement of the canal system of their state. What the total cost of transportation on the new barge canal now emerging from the old Erie will be, no one is in a position to know definitely. The Greene committee of 1899 estimated the cost of the barge canal at about $60,000,000. Already more than $100,000,000 has been voted for this purpose, with the possibility that another $19,000,000 will be required for terminals. The Greene committee also made an estimate of the cost to the boatmen of conveying goods through the barge canal, corresponding to their estimate of 1.75 mills on the old Erie referred to in an earlier paragraph. The estimate on the barge canal was 0.52 mill. Whether this estimate will prove to be approximately accurate, or whether time will show it to have been too low, no one at the present time can tell, as no facts exist on which even an approximation may rest. It is clear, however, that having added so greatly to the cost of the canal, rates must be much lower, or volume of traffic far greater, or cost of maintenance and repair lower in proportion to volume of traffic—one or all of these must result before the total cost of transportation on the new Erie will fall to or below the level of the average railway freight rate.

It seems clear, then, from the data presented in the foregoing pages, that the transportation of goods on the Erie canal at the present time is a more expensive process, considered from the broadest point of view, than on the typical or average American railway, whether or not that railway be one that competes directly with the canal.

# General News Section.

The Southern Railway has advanced the pay of all clerical employees who have been receiving $70 a month or less.

The New York Central is now running electrically propelled trains between New York and Tarrytown, on the Hudson division, 24½ miles.

The New York, New Haven & Hartford has been fined $250 at New York City for maintaining a nuisance in the use of soft coal in a locomotive.

Damages to railways in southwestern Colorado by the floods of last month have, in many cases, only just been repaired. Some of the towns on the Denver & Rio Grande were without railway service for forty days.

The Grand Trunk, as mentioned recently in these columns, has indicated to the Indiana railway commission that it will install automatic block signals on its line from Valparaiso, Ind., to Chicago before July 1, 1912, and from Valparaiso east to the Indiana state line before January 1, 1913.

According to the *Washington Post* enough senators are displeased with the Commerce Court for suspending the reductions in trans-continental freight rates which were ordered by the Interstate Commerce Commission, to justify the hopes, which are entertained in many quarters, that a bill can be passed in the senate abolishing the Commerce Court.

The Maine Central has bought from the Boston & Maine two Mallet compound locomotives, which were used in the Hoosac tunnel prior to its electrification. The Maine Central will operate the engines on the division from Portland, Me., northwesterly through the White mountains of New Hampshire. They are the first Mallet compound engines ever owned by the Maine Central.

The Buffalo, Rochester & Pittsburg is to introduce telephones for train despatching on 160 miles of its line. The Chicago & North Western has ordered telephone apparatus for the line from Boone to Council Bluffs, 150 miles. The Pittsburgh, Shawmut & Northern has ordered telephone apparatus for despatching on its line between St. Marys, Pa., and Brookville, about 50 miles. All of these companies bought their apparatus from the Western Electric Company.

Irving G. Barger, a messenger of the United States Express Company on the Delaware, Lackawanna & Western, was murdered in his car by a robber on the night of November 17 within the space of four minutes, Barger having been seen alive at Taylor, a station south of Scranton at 8:26, and having been found dead at Scranton, when the train arrived there at 8:30. The messenger had been shot, and his safe had been emptied of most of its valuables.

### Shippers Considering the Proposed Clearance Law.

Members of the National Industrial Traffic League have been asked to make a special study of the proposed Federal law relating to clearances between structures located on railways and cars passing over the lines of the latter. The various firms connected with the organization are asked to prepare statements showing what the approximate cost to them will be in the event the provisions of the proposed law are enforced. According to President J. C. Lincoln, a large industrial concern reported that compliance with such a law would cost it more than $1,600,000

### Unfilled Tonnage of the Steel Corporation.

The report of the United States Steel Corporation shows that the unfilled tonnage on October 31 was 3,694,328 tons, an increase of 83,011 tons over the previous month. This is the highest that it has been since July 31, 1910, when it was 3,970,931 tons, with the exception of August 31, 1911, when it was 3,695,985 tons. The October unfilled tonnage was not a surprise, for during that month new business was received at the rate of about 35,000 tons a day, and shipments were at the rate of about 32,000 tons a day, or close to 10,000,000 tons a year. In October, 1910, the unfilled tonnage showed a shrinkage of 276,000 tons from the preceding month.

### Cost of Snowsheds.

In a report to the California State Railroad Commission the Southern Pacific states that it has 35 miles of snowsheds in the Sierra Nevada Mountains, valued at $2,250,000. During the past four years fires in the sheds have cost $186,262, an annual average of $46,565. Renewals on account of wear are placed at $67,000, and repairs at $40,000 per annum. The total annual expense, including patrolling, and fire trains, is stated to be $203,615.

### Hudson-Manhattan Trains Through to Newark.

The Pennsylvania Railroad and the Hudson & Manhattan announce that their joint passenger line from Cortlandt and Church streets, New York, to Park place, Newark, N. J., 8.9 miles long, will be put into full operation next Sunday. The Hudson tunnel trains have been running as far as Manhattan Transfer, a mile east of Newark, for some weeks, but the completion of the concrete viaduct into Newark was delayed by legal difficulties. Running towards New York in the morning and out of New York in the afternoon these trains will be from six to twelve minutes apart, and in all there will be 86 trains a day eastward and 74 westward. These trains run over the old line of the Pennsylvania from Summit avenue, Jersey City, to Manhattan Transfer; westerly from Manhattan Transfer to Newark the line is elevated, crossing the Passaic river by a new double-deck bridge; and east of Summit avenue the line is underground and under-river. The lower deck of the drawbridge at Newark is used by freight trains of the Pennsylvania as an entrance to the Newark city freight house, formerly reached over the Center street line.

### Bristol Improvement Finished.

The Pennsylvania Railroad announces that, beginning next Sunday, its trains will run through Bristol, Pa., on the New York division, over the new line through that town which has been under construction for the last two years. This line is about 80 rods shorter than the one which it supplants. The new road, like the old, is a four-track line and has track tanks on all four tracks for supplying water to the locomotives. The improvement has cost $1,012,000, and ten grade crossings are abolished. The new line is carried over the streets of the city by four reinforced concrete bridges and three bridges of reinforced concrete slabs. The new passenger station is at Beaver Dam Road and stands at the street level, passengers ascending to the track platforms by covered stairways. This building is of stone from local quarries, ornamented with Indiana limestone.

### Threatened Strike of Rock Island Shop Employees.

A full statement of the points involved in the pending controversy between the Rock Island Lines and their shop employees, failure to settle which has resulted in a breach in the negotiations and threat of a strike by the employees, has been issued by the management of the road. It is signed by W. A. Nettleton, general superintendent, and by W. S. Tinsman, A. E. Sweet, and W. M. Whittenton, general managers of the three districts of the road, is addressed to the public and the shop employees, and is as follows:

In view of the rumors of an impending strike of the shop employees of the Rock Island Lines, and recognizing the right of the public to have full information on a question that involves its welfare, as well as one which involves the surrender to a committee of employees of the right to say in what manner the corporation shall perform its service to the public, the following statement is submitted:

The policy of the company has always been one of fairness toward its employees. It has withheld retrenchment of forces as long as possible. It has always paid wages equal to those of contiguous lines. Its men have always served under working rules and conditions as favorable as those of contiguous lines.

In view of these facts and the present business conditions of the country, this company could not consider anything that contemplated an increase in its expenses, and the general

committee of shop employees, at the beginning of the conferences, over four months ago, were fairly advised of this. But, notwithstanding that notice, the above committee insisted upon pressing negotiations that finally terminated November 10, 1911.

Briefly, the issues upon which the employees' committee justify a strike are as follows:

(1.) They demand that the payment of five hours minimum overtime shall commence one hour earlier than at present. The company declines this, because of increased expense, with no compensating return.

(2.) They demand that any employee called to work overtime shall "be released upon completion of the job called or held for, unless other emergency work arises which requires immediate attention and he is the only man of his craft on duty." The company declines this, because of increased expense, and for the reason that a man is given a minimum of five hours' pay if he works after six a. m. or p. m. The company has a right to the use of the man for the time paid, even though the job for which he is called may not consume all of that time.

(3.) They demand that laying off and employing men shall be governed exclusively by seniority. The company declines this, for the reason that its schedules with all other employees provide that ability of the individual shall be taken into consideration in employing and promoting men and in reducing forces. It is the duty of the company to treat all employees alike and to give all fair and equal consideration, to the end that the most efficient, honest and diligent workmen shall be given steady employment, and for the further reason that if forces were to be reduced in the manner demanded by the employees it would permit them to indicate those to be laid off, thereby prohibiting the company from ridding the service of the less desirable employees, and thus embarrassing it in its efforts for economical operation.

(4.) They demand that only "running repair" work be done when shops are closed; that time and one-half be paid to men employed in regular hours, when shops are closed, upon miscellaneous repairs to locomotives or cars, or upon what is commonly known as "dead" work. The company declines this, because of increased expense which would result from an idle force of such men, a greater part of the time, as are necessary to be employed in keeping up running repairs when shops are closed, and declined for the further reason that it prevents the company from exercising its right to conduct its own business in the most economical manner.

(5.) They demand that no foreman, either regular or temporary, be permitted to work at any time when mechanics are available. The company declines this, for the reason that such a rule would prevent the company from retaining its foremen and thus maintaining its organization in times when shops are closed.

(6.) They demand that applicants for employment "shall only be required to give the name, position wanted, address and address of nearest relative." This question also involves the right of the company to secure the personal records of applicants for employment, and, indirectly, although not appearing in the demand, the ability of the company to apply its pension system alike to all employees. The pension system, created to care for aged employees, is frankly opposed by the committee representing the employees in the mechanical crafts. The company declines for the reason that it has one application blank for all candidates for employment. It cannot and will not make any different rule for applicants for employment in the mechanical department from that made for applicants for employment in other departments. All must be treated alike. The pension system that has been established must govern all employees from the highest to the lowest. This company has the undoubted obligation to its employees, as a class, to insist upon these things, and, further, to know the history of the men it is to employ, as far as it is able to so determine.

In addition to the above articles, the committee demands an increase of two cents per hour, which, with the articles dealing with compensation outlined above, means a tremendous increase in the expenses of the company, without contemplating any return in the shape of additional service or of economy in any form. Articles not dealing directly with compensation seek to take from the company its right to conduct its business in its own way and to protect the interest of its employees at large.

The mechanical committee seeks to create a different set of rules for one class of employees from that which exists for all other employees. They seek to deny to the company the right which belongs to every citizen and employer to require persons entering his service to give evidence of good character and sound health. A departure from this practice, as outlined by the rule proposed by the employees' committee, would permit the employment of diseased, incompetent, inefficient and immoral men. No honest man need in any way be embarrassed by complying with the rules of the company in the matter of employment.

To the final proposition of the Railway Company, the men have answered advising that they will strike if the company does not come to satisfactory settlement with the committee. The negotiations are thus ended by the shop employees' committee. In order to have the employees thoroughly understand the conditions under which they are working, the company hereby announces its intention of continuing in effect until further notice the rates of pay and working conditions as outlined by the schedules in existence at the time of their cancellation by the committee.

### Extension of a Chinese Railway.

The short section of the Sunning railway between Kung-yik and Tow-shan, China, which was opened to traffic last year, has proved profitable and its extension to Sunwui, whence it would have water connection with Hongkong, is expected in the near future. The earnings of the railway have averaged about $10,000 a month. The road was built with funds three-fourths of which were raised by Chinese from the Sunning district living in California and the remainder locally. All of its cars and most of its locomotives were made in the United States. The promoter of the railway was a Chinese who had spent many years in America.

### Western Railway Club.

At the regular monthly meeting of the Western Railway Club, held at the Auditorium hotel, Chicago, on November 21, the paper for discussion was on the Use of Denatured Alcohol in Railway Service, by Michael Schwarz, manager of the Alcohol Utilities Company.

### Transportation and Car Accounting Officers.

The Association of Transportation and Car Accounting Officers' Association will hold its next regular meeting at the Seelbach Hotel, Louisville, Ky., December 12 and 13.

## MEETINGS AND CONVENTIONS.

*The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.*

Air Brake Association.—F. M. Nellis, 53 State St., Boston, Mass.

American Association of Demurrage Officers.—A. G. Thomason, Boston, Mass.

American Association of General Passenger and Ticket Agents.—W. C. Hope, New York; next convention, Seattle, Wash.

American Association of Freight Agents.—R. O. Wells, East St. Louis, Ill.; annual, June 18-21, Chicago.

American Association of Railroad Superintendents.—O. G. Fetter, Carew building, Cincinnati, Ohio; 3d Friday of March and September; annual, March 17, Chicago.

American Electric Railway Association.—H. C. Donecker, 29 W. 39th St., New York.

American Railway Association.—W. F. Allen, 75 Church St., New York.

American Railway Bridge and Building Association.—C. A. Lichty, C. & N. W., Chicago. Next annual convention, third week in October, 1912, Baltimore, Md.

American Railway Engineering Association.—E. H. Fritch, Monadnock Block, Chicago; annual convention, March 19-21, 1912, Chicago.

American Railway Master Mechanics' Association.—J. W. Taylor, Old Colony building, Chicago. Annual convention, June 17-19, Atlantic City, N. J.

American Railway Tool Foremen's Association.—M. H. Bray, N. Y., N. H. & H., New Haven, Conn.

American Society for Testing Materials.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.

American Society of Civil Engineers.—C. W. Hunt, 220 W. 57th St., New York; 1st and 3d Wed., except June and August, New York.

American Society of Engineering Contractors.—J. R. Wemlinger, 13 Park Row, New York; 2d Tuesday of each month, New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York. Annual meeting, December 5-8, New York.

ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago; annual, June 26, 1912, Quebec, Que.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—J. R. McSherry, C. & E. I., Chicago; annual convention, May 22, 1912, Los Angeles, Cal.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 135 Adams St., Chicago; annual, June 24, 1912, New York.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York; December 12-13, Louisville, Ky.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 2d Tuesday in month, except June, July and Aug., Montreal.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 413 Dorchester St., Montreal, Que.; Thursdays, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month, Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Thurs. in Jan. and 2d Fri. in March, May, Sept., Nov., Buffalo, N. Y.

CIVIL ENGINEERS' SOCIETY OF ST. PAUL.—D. F. Jurgensen, 116 Winter St., St. Paul, Minn.; 2d Monday, except June, July and Aug., St. Paul.

ENGINEERS' SOCIETY OF PENNSYLVANIA.—E. R. Dasher, Box 704, Harrisburg, Pa.; 1st Monday after 2d Saturday, Harrisburg, Pa.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, 803 Fulton building, Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Richmond, Va.; annual, May 15, Buffalo, N. Y.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—E. S. Koller, 226 W. Adams St., Chicago; Wed. preceding 3d Thurs., Chicago.

INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, rue de Louvain, 11 Brussels; 1915, Berlin.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—D. B. Sebastian, La Salle St. Station, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan, Brown Marx building, Birmingham, Ala.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, Lima, Ohio.

IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August, Des Moines.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York; annual convention, May 14-17, Pittsburgh, Pa.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago. Annual convention, June 12-14, Atlantic City, N. J.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION, OF UNITED STATES AND CANADA.—A. P. Dane, B. & M., Reading, Mass.; next annual convention, second week in September, 1912.

NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept., Boston.

NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August, New York.

NORTHERN RAILWAY CLUB.—C. L. Kennedy, C., M. & St. P., Duluth, Minn; 4th Saturday, Duluth.

OMAHA RAILWAY CLUB.—H. H. Maulick, Barker Block, Omaha, Neb.; second Wednesday.

RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Penna. R. R., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh

RAILWAY INDUSTRIAL ASSOCIATION.—G. L. Stewart, St. L. S. W. Ry., St. Louis, Mo.; annual, May 12, 1912, Kansas City, Mo.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Bethlehem, Pa.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio.

RICHMOND RAILROAD CLUB.—F. O. Robinson, Richmond, Va.; 2d Monday, except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W., Sterling; September, 1912, Buffalo, N. Y.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug., St. Louis.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Nyquist, La Salle St. Station, Chicago.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant bldg., Atlanta, Ga.; 3d Thurs., Jan., March, May, July, Sept., Nov., Atlanta.

TOLEDO TRANSPORTATION CLUB.—J. G. Macomber, Woolson Spice Co., Toledo, Ohio; 1st Saturday, Toledo.

TRAFFIC CLUB OF CHICAGO.—Guy S. McCabe, La Salle Hotel, Chicago; meetings monthly, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Erie, Pittsburgh, Pa.; meetings monthly, Pittsburgh.

TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7042 Stewart Ave., Chicago; annual, June 18, 1912, Louisville, Ky.

TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; first Saturday after first Wednesday.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, L. S. & M. S., Detroit, Mich.; meetings monthly.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y.; August, 1912.

WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, Old Colony building, Chicago; 3d Tuesday of each month, except June, July and August.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago; 1st Wednesday in month except July and August, Chicago.

WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Baltimore, Md.; annual, January 16-18, Chicago.

# Traffic News.

From Winnipeg, Man., it is reported that all of the railways are suffering from severe congestion of freight because of unusual efforts to ship wheat eastward before the close of navigation.

Reports from Cherryfield, Me., state that the extensive tracts of land recently bargained for in that region by the Maine Central have finally been bought, and that they will be used for agricultural purposes. These lands aggregate 36,000 acres. It is proposed to establish numerous experimental farms, and it is said that after the experiments shall have been conducted a sufficient time, the land will be offered for sale to farmers.

The New York, Ontario & Western has withdrawn its notice of a proposed reduction in rates on freight westbound from New York to Chicago and other western territory, so that the present rates, 75 cents per 100 lbs. (first class) New York to Chicago will continue in force. The notice which had been issued, reduced all rates to the basis formerly in effect, 6 cents (first class) less than the standard rate. The Erie and the Lackawanna had signified their intention of meeting the 69-cent rate.

The "Governors' Special" is again announced—this time in a despatch from St. Paul, which says that the train is to start east November 27. It will consist of eleven cars, and there will be on it the governors of ten or more western states. Four of the cars will be filled with agricultural and mineral products of those states, forming an exhibit which is to be shown in 22 cities. The enterprise is managed by the Northwest Development League. In Baltimore, December 8, the governors expect to meet seven governors of southern states.

Advertising representatives of the Western railways, including the Rock Island lines, the Burlington, the Missouri Pacific, the Union Pacific, the Chicago & North Western and the Chicago, Milwaukee & St. Paul, were guests of the Colorado Springs Chamber of Commerce during the week beginning October 30. A trip was made each day to some place of interest in the vicinity of Colorado Springs; Pike's Peak, the Cripple Creek district, the Cheyenne canyons, Manitou, Canyon City and the Royal Gorge having been visited, and luncheon was served while on the trip.

The Wabash, Chester & Western, a road in Southwestern Illinois, has filed in the United States district court at Springfield, Ill., a petition to restrain the enforcement of the 2-cent fare law against it. The petition alleges that the Illinois maximum 2-cent fare law is unreasonable, unjust, oppressive, discriminatory, confiscatory and void. The gross receipts of the road from passenger service are said to be inadequate to secure a reasonable profit. Arguments on the state's objections to the report of the master in chancery in the Chicago, Peoria & St. Louis 2-cent rate case will be heard at Springfield, November 27.

Bernard W. Baker of Baltimore, president of a proposed independent American company to run steamships between the ports of the Atlantic and the Pacific by way of the Panama canal, has complained to President Taft that bankers in New York City, who had promised him money, had suddenly, of one accord, all withdrawn their promises; and he says that this strange action is due to the influence of the trans-continental railways, the owners of which desire, if possible, to stave off the establishment of any means of transportation between the Atlantic and the Pacific, which may take a part of their traffic. A number of bankers, interviewed by the newspapers, declare Mr. Baker's charges to be unfounded, and say that his present real or apparent lack of success is due to inherent defects in his plan.

The New England shippers who have been discussing the value of the demurrage bureau at Boston have presented to the railways and to the Interstate Commerce Commission a number of proposed changes which they desire to have made in the demurrage rules, particularly one to modify the average rule. In the same connection they call for the continuance of the Boston bureau under the present plan, by which the commissioner is responsible jointly to the railways, the government and the shippers, declaring that no commissioner who is responsible only to

the railways can properly perform the functions of such an office; and the present commissioner, Mr. Thomason, is commended as able and impartial. At Chicago a committee of the National Industrial Traffic League is also formulating proposals concerning changes desired in the uniform demurrage rules.

The Hudson & Manhattan announces that beginning December 24 the fare for the longer trips in its trains will be increased from 5 to 7 cents. To all stations on Sixth avenue, Manhattan, from all points in New Jersey, the 7-cent rate will apply. The fares will still remain considerably cheaper than those by rival lines, which consist of a combination of street car and ferry service. The universal 5-cent rate was adopted by the company voluntarily, at the opening of the line three years ago, in the hope that the traffic would be heavy enough to justify it. In the statement now issued the company is quoted in part in our column of Financial News. The extension of the tunnel lines westward from the shore of the river at Jersey City is now in use for trains running through to Newark, but the station at Summit avenue, Jersey City, something more than a mile from the shore, has not yet been opened. With this station opened, the fare to or from Cortlandt street, New York, will be 5 cents, and the 5-cent rate will also be retained for all trips which do not cross the river. The trains of the Hudson & Manhattan will next week begin running through between Church street, New York, and Park place, Newark; and the fare will be 17 cents single; 30 cents round trip; $6 for 50-ride family tickets, and $5.65 for individual monthly tickets.

### Car Surpluses and Shortages.

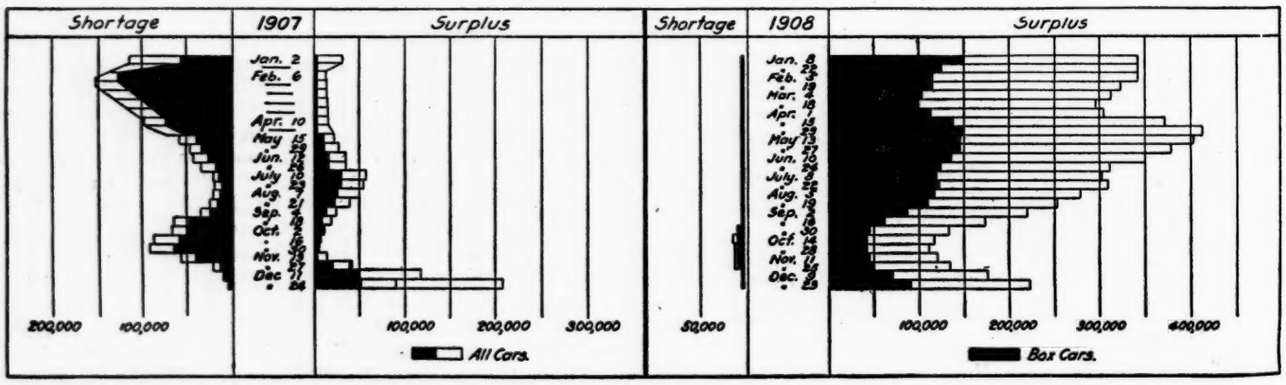
Arthur Hale, chairman of the committee on relations between railways of the American Railway Association, in presenting statistical bulletin No. 107, giving a summary of car shortages and surpluses by groups from July 6, 1910, to November 8, 1911, says:

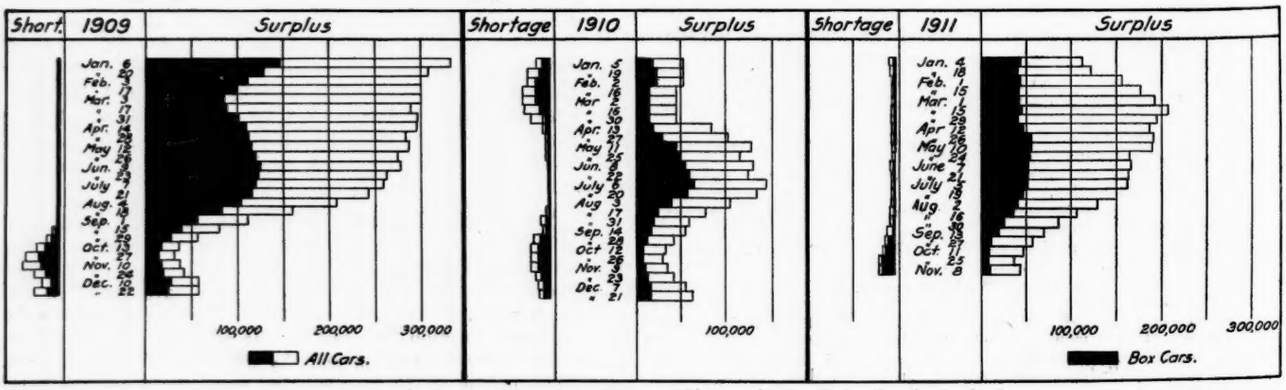
"There is an increase of 5,984 cars in the surplus, making a total surplus of 45,290 cars. The largest increase is shown to be in coal cars, which increased from 12,148 cars on October 25, 1911, to 16,398 cars on November 8, 1911, an increase of 4,250 cars. The increase in surplus coal cars is chiefly in group 2

CAR SURPLUSES AND SHORTAGES.

| Date. | No. of roads. | Surpluses Box. | Flat. | Coal, gondola and hopper. | Other kinds. | Total. | Shortages Box. | Flat. | Coal, gondola and hopper. | Other kinds. | Total. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Group *1.—November 8, 1911 | 7 | 213 | 674 | 203 | 219 | 1,309 | 518 | 125 | 250 | 274 | 1,167 |
| " 2.— " 8, 1911 | 25 | 554 | 90 | 5,214 | 1,409 | 7,267 | 187 | 0 | 153 | 160 | 500 |
| " 3.— " 8, 1911 | 26 | 67 | 344 | 5,563 | 1,868 | 7,842 | 3,716 | 0 | 65 | 1,061 | 4,842 |
| " 4.— " 8, 1911 | 10 | 19 | 32 | 584 | 585 | 1,220 | 614 | 143 | 1,404 | 0 | 2,161 |
| " 5.— " 8, 1911 | 18 | 123 | 51 | 596 | 932 | 1,702 | 560 | 120 | 517 | 33 | 1,230 |
| " 6.— " 8, 1911 | 24 | 5,933 | 806 | 1,337 | 3,709 | 11,785 | 108 | 6 | 100 | 7 | 221 |
| " 7.— " 8, 1911 | 3 | 107 | 15 | 0 | 684 | 806 | 50 | 0 | 41 | 0 | 91 |
| " 8.— " 8, 1911 | 19 | 379 | 79 | 1,068 | 1,374 | 2,900 | 1,784 | 128 | 431 | 74 | 2,417 |
| " 9.— " 8, 1911 | 9 | 1,391 | 84 | 416 | 535 | 2,426 | 460 | 0 | 0 | 0 | 460 |
| " 10.— " 8, 1911 | 19 | 721 | 756 | 1,417 | 4,515 | 7,409 | 2,296 | 124 | 25 | 0 | 2,445 |
| " 11.— " 8, 1911 | 5 | 0 | 110 | 0 | 514 | 624 | 2,997 | 84 | 0 | 161 | 3,242 |
| Total | 165 | 9,507 | 3,041 | 16,398 | 16,344 | 45,290 | 13,290 | 730 | 2,986 | 1,770 | 18,776 |

*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland, and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan and Western Pennsylvania lines; Group 4—West Virginia, Virginia, North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida lines; Group 6—Iowa, Illinois, Wisconsin, Minnesota and the Dakotas lines; Group 7—Montana, Wyoming and Nebraska lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Oregon, Idaho, California and Arizona lines; Group 11—Canadian lines.




Car Surpluses and Shortages in 1907 to 1911.

(New York, New Jersey, Delaware, Maryland, eastern Pennsylvania) and group 3 (Ohio, Indiana, Michigan, western Pennsylvania). There are also increases of 2,341 cars and 213 cars in box car surplus and miscellaneous car surplus, respectively, while flat cars show a decrease of 820 cars. The increase in box car surplus is principally in group 6 (Iowa, Illinois, Wisconsin, Minnesota, Dakotas).

"The total car shortage is practically the same as reported in the previous period, although the totals for the various classes of cars show changes. The increase in surplus cars is setting in at exactly the same period as last year, and the amount of increases for this report is almost identical with that for the corresponding period in 1910. The total surplus this year, however, is slightly higher than last year, having been 34,581 on November 9, 1910, as against 45,290 for this report."

The accompanying table gives car surplus and shortage figures by groups for the last period covered in the report, and the diagrams show total bi-weekly surpluses and shortages in 1907 to 1911.

### A Frisco Line to New Orleans.

The St. Louis & San Francisco, following the failure of its plans to stablish a connection with New Orleans on the west side of the Mississippi river by means of an alliance with the Texas & Pacific, announces that a connection from Memphis to New Orleans (and also to Mobile) is to be established on the east side of the river. Jointly with the Louisville & Nashville the "Frisco" has acquired an interest in the New Orleans, Mobile & Chicago, which extends from New Albany, in the northern part of Mississippi, on the Frisco's line to Birmingham, southward to Laurel, 214 miles, and thence southeastward to Mobile, 111 miles further. From some point north of Mobile, an extension of this line is proposed to be built southwestward to the Louisville & Nashville, thus giving a short-line connection with New Orleans. The arrangement between the three roads also provides for extension of the New Orleans, Mobile & Chicago northward to Jackson, Tenn., where a connection can be made with the Nashville, Chattanooga & St. Louis. By this proposed combination of lines the distance from Memphis to New Orleans will be 49 miles less than by the route which has been proposed west of the river.

### National Industrial Traffic League.

The National Industrial Traffic League held its annual meeting in Chicago last week, and J. M. Belleville, of the Pittsburgh Plate Glass Company, was elected president.

A committee was appointed to confer with the committee on relations of railways of the American Railway Association, with a view to discussing numerous desired revisions of the uniform demurrage and car service rules. It is intended to gather and digest the views of all interests in all parts of the country, so as to present a comprehensive report on this subject.

A report on refund of overcharges developed in revising billing, presented the committee on freight claims and referring to negotiations of that committee with the Association of American Railway Accounting Officers and the American Association of Freight Agents, was adopted.

It was recommended that when the report of the Uniform Classification Committee is sent to the carriers for adoption, it should be placed in the hands of shippers at least 30 days before the meeting of the classification committee, and that all classification committees shall provide for public hearings on all subjects to be considered by them at their meetings, and that 30 days' notice be given. A letter from D. O. Ives, chairman of the league committee on classification, which was read at the meeting, expressed doubt as to the legal right of the shippers to compel such publicity. Another member stated that Chairman Clements, of the Interstate Commerce Commission, in reply to a letter regarding the matter, said the commission had no jurisdiction over the subject.

Several changes were outlined for the uniform bill of lading and the standard bill of lading, and reference was made to the Stephens bills and the Adamson bill, both introduced in Congress, dealing with bills of lading. Both were said to contain excellent features, but they also contain features not altogether satisfactory, and it was recommended that the legislative committee and the bill of lading committee of the league jointly consider them, with a view to adopting the best features of both and then making recommendations to the proper committee of Congress.

The bill before Congress prescribing car clearances was strongly opposed. J. M. Belleville, of the Pittsburgh Plate Glass Company, said his firm could not market 15 per cent. of its product if the bill became a law. Another member said that for the city of Duluth to comply with a similar bill which had been introduced in Minnesota would cost $15,000,000. Doubt was expressed as to whether it would reduce accidents or have any effect other than to bar the plea of contributory negligence where accident did result from obstructions not in accordance with the bill. It was decided to appoint a committee of 15 to oppose the bill in Congress.

Attention was called to a plan tried at Jacksonville, Fla., of having shippers employ a force of inspectors at various freight stations in large centers to work in the interest of shippers and receivers of freight. The proposition was simply laid before the league, with the suggestion that it be adopted wherever it would be found necessary and practicable. There was a feeling that it would be too costly at the very large cities.

The carriers who have been making special efforts to reduce friction over the settlement of claims were commended. Particular attention was called to the new method of handling and settling claims adopted by the St. Louis & San Francisco.

A standing baggage committee is to be appointed by the league to confer with the national baggage committee, which was recently named at Chicago by representatives of commercial concerns interested in excess baggage rates and regulations.

At the annual dinner, which was held Thursday evening, well known speakers advocated closer co-operation between shippers and railways. Among the speakers were O. P. Gothlin, chairman of the State Public Service Commission of Ohio, and W. A. Garrett, chairman of the Chicago General Managers' Association.

Mr. Garrett reminded the manufacturers that it would cost railways $630,500,000 to comply with the provisions of a bill now pending in Congress, requiring the use of steel cars. Traffic Director Bartow of the Chicago Association of Commerce claimed that the freight classification committees came within the scope of the Sherman anti-trust law and might be convicted of illegal conspiracy whenever shippers wished to go that far.

### Railway Earnings in Russia.

The financial reports of the Russian railways show that the total receipts for all the railways were $577,190,500, or $80,232,000 more than the estimates, and $39,162,000 more than the receipts for 1909. The operation expenses were $377,764,900, or $7,340,200 more than the estimates and $6,103.500 less than in 1909. Thus the excess of total receipts over the total expenditures for 1910 amounted to $199,425,000, or $73,891,800 more than the estimates, and $42,265,522 more than in 1909. The net profit was $197,525,000, or $76,202,700 more than the estimate, and $44,602,210 more than in 1909. The net profit on the treasury railways amounted to $124,558,040, or $48,686,160 more than the estimates, and $29,660,350 more than in 1909. The net profits for the private railways made $72,966,900, or $27,516,347 more than estimated, and $14,939,808 more than 1909. Analyzing the various results from the treasury railways we find that the Southern line yielded the largest profit. Then the South Western, the Ekaterinsk, the Nikolaieffsk North Western, Northern, Riga-Orel, the Moscow Kursk-Nizhegorod, and the Privislinsk. Amongst the treasury railways, in Asiatic Russia a deficit of $3,621,260 was anticipated. There was a surplus in the receipts over the expenditure on the Tashkent line of $4,255,130; on the Siberian line of $3,323,450; and on the Central Asiatic line of $1,421,930; and on the Trans-Baikal line there was a surplus of receipts over expenditures of $6,079,330. Among the private lines the most profitable are the Caucasian railway with $14,911,380 net profit and the South Eastern railway, with $14,765,830 net profit.

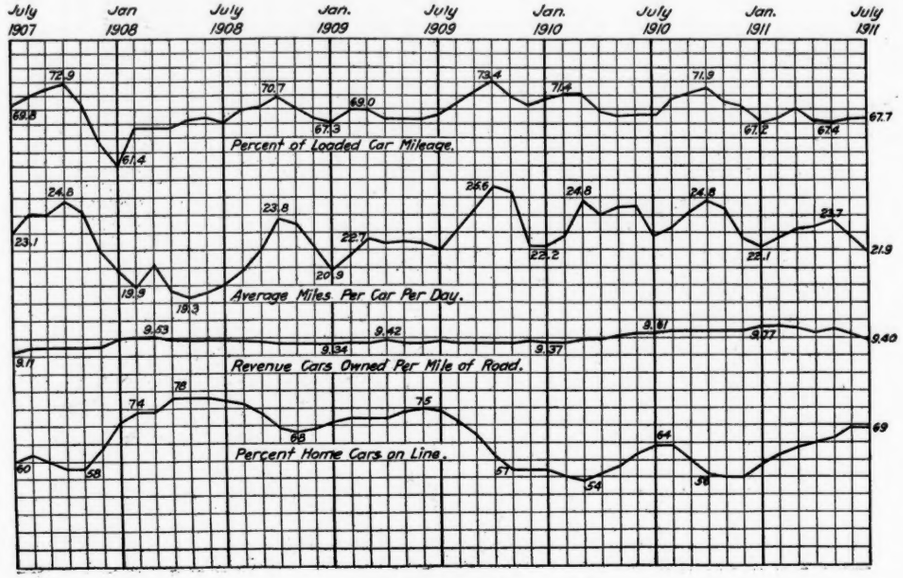
### Freight Car Balance and Performance.

Arthur Hale, chairman of the committee on relations between railways of the American Railway Association, in presenting the statistical bulletin No. 108, covering car balance and performance for July, 1911, says:

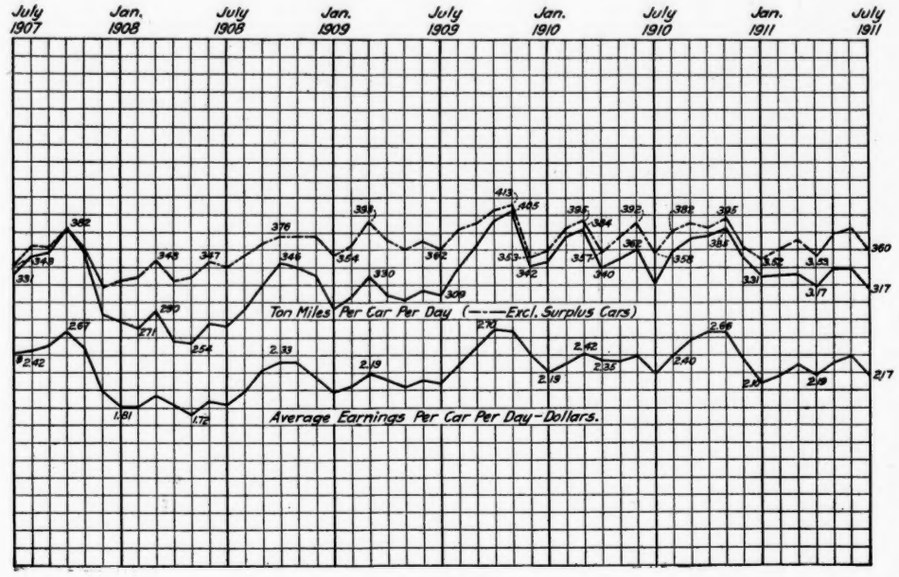
Most items of performance for July, 1911, show a decrease in

CAR BALANCE AND PERFORMANCE IN JULY, 1911.

| | New England. | N. Y., N. J., Del., Md., Eastern Pa. | Ohio, Ind., Mich., Western Pa. | Va., W. Va., No. and So. Carolina. | Ky., Tenn., Miss., Ala., Ga., Fla. | Iowa, Ill., Wis., Minn. | Mont., Wyo., Neb., Dakotas. | Kan., Colo., Okla., Mo., Ark. | Texas, La., New Mex. | Ore., Idaho, Nev., Cal., Ariz. | Canadian Lines. | Grand Total. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Revenue freight cars owned | 85,105 | 491,591 | 215,212 | 186,236 | 167,554 | 392,113 | 18,694 | 136,350 | 25,744 | 144,749 | 106,063 | 1,969,411 |
| Average number of system cars on line | 51,370 | 339,247 | 158,441 | 122,715 | 114,590 | 298,060 | 7,866 | 99,877 | 24,006 | 69,687 | 76,150 | 1,362,009 |
| Railway-owned cars: Average foreign on line | 36,959 | 130,972 | 75,720 | 48,641 | 38,929 | 95,692 | 12,264 | 34,707 | 8,872 | 50,920 | 29,836 | 563,212 |
| Total Railway-owned cars on line | 88,029 | 470,219 | 234,161 | 171,356 | 153,519 | 393,752 | 20,130 | 134,584 | 32,878 | 120,607 | 105,986 | 1,925,221 |
| Excess | 2,924 | ..... | 18,949 | ..... | ..... | 1,639 | 1,436 | ..... | 7,134 | ..... | ..... | ..... |
| Per cent. of cars on line to total owned: | | | | | | | | | | | | |
| Home | 60 | 69 | 74 | 66 | 68 | 76 | 42 | 73 | 93 | 48 | 72 | 69 |
| Foreign | 43 | 27 | 35 | 26 | 23 | 24 | 66 | 25 | 34 | 35 | 28 | 29 |
| All railways | 103 | 96 | 109 | 92 | 91 | 100 | 108 | 98 | 127 | 83 | 100 | 98 |
| Private cars on line | 3,177 | 30,420 | 11,680 | 2,896 | 6,079 | 15,470 | 1,452 | 7,312 | 2,405 | 11,340 | 2,536 | 94,767 |
| Total, all cars on line | 91,206 | 500,639 | 245,841 | 174,252 | 159,598 | 409,222 | 21,582 | 141,896 | 35,283 | 131,947 | 108,522 | 2,019,988 |
| Per cent. of cars in shop | 8.44 | 9.41 | 10.63 | 7.83 | 11.11 | 7.97 | 7.47 | 10.80 | 6.15 | 6.44 | 7.47 | 9.05 |
| No. of freight engines owned | 1,229 | 7,591 | 3,064 | 3,109 | 2,542 | 6,317 | 525 | 2,649 | 671 | 2,687 | 2,130 | 32,505 |
| Average cars on line per freight engine owned | 74 | 66 | 80 | 56 | 63 | 65 | 41 | 54 | 53 | 49 | 51 | 62 |
| Total freight-car mileage | 45,577,778 | 497,433,108 | 152,676,736 | 122,621,785 | 119,686,526 | 270,773,987 | 23,948,104 | 84,515,366 | 24,289,734 | 110,168,451 | 91,943,646 | 1,543,635,221 |
| Average miles per car per day | 16.1 | 20.8 | 20.0 | 22.7 | 24.2 | 21.3 | 35.8 | 20.1 | 22.2 | 26.9 | 27.3 | 21.9 |
| Per cent. loaded mileage | 70.3 | 65.3 | 66.7 | 64.2 | 68.2 | 69.5 | 71.0 | 69.2 | 68.0 | 70.4 | 73.5 | 67.7 |
| Ton-miles of freight, including company freight | 470,239,825 | 7,415,699,060 | 2,242,616,919 | 1,895,391,239 | 1,570,876,485 | 2,499,302,126 | 332,487,762 | 1,131,710,364 | 281,668,682 | 1,582,640,052 | 1,182,371,411 | 20,605,003,925 |
| Average ton-miles, including company freight: | | | | | | | | | | | | |
| Per car-mile | 10.3 | 15.3 | 15.7 | 15.5 | 13.2 | 12.6 | 14.5 | 13.4 | 11.6 | 14.6 | 12.9 | 14.2 |
| Per loaded car-mile | 14.7 | 23.4 | 23.3 | 24.1 | 19.4 | 18.5 | 20.5 | 19.6 | 17.1 | 20.7 | 17.5 | 21.1 |
| Per car per day | 166 | 339 | 320 | 351 | 321 | 271 | 541 | 269 | 258 | 392 | 351 | 317 |
| Gross freight earnings | $5,345,631 | $44,444,939 | $12,899,601 | $10,597,488 | $10,272,325 | $26,563,162 | $2,665,311 | $7,353,100 | $2,336,817 | $14,498,193 | $8,470,662 | $145,447,229 |
| Average daily earnings: Per car owned | $2.03 | $2.09 | $1.93 | $1.84 | $1.98 | $2.19 | $4.60 | $2.44 | $2.93 | $3.23 | $2.58 | $2.22 |
| Per railroad car on line | 1.96 | 2.18 | 1.78 | 1.99 | 2.16 | 2.18 | 4.27 | 2.51 | 2.29 | 3.88 | 2.58 | 2.27 |
| All cars on line | 1.90 | 2.05 | 1.69 | 1.96 | 2.08 | 2.09 | 3.98 | 2.37 | 2.14 | 3.54 | 2.51 | 2.17 |




Car Performance.




Car Earnings.

business as is usual for that time of the year. The average miles per car per day show a decrease of 1 mile per car per day as compared with June, 1911, while the average ton miles remain nearly normal. The average ton miles per car per day for all cars show a decrease of only 21 ton miles as compared with June, 1911. The same items excluding surplus and shop cars show a decrease of 26 ton miles. Average earnings per car per day decreased from $2.38 to $2.17, while the average earnings per car per day excluding idle cars decreased from $2.67 to $2.44.

The accompanying table gives the figures for July and the charts show car earnings and performance by months in 1907 to 1911.

### The Traffic Club of New York.

The annual meeting of the Traffic Club of New York and the election of officers will he beld on November 28 at the Waldorf-Astoria Hotel. In addition to the inauguration of the officers elect, a vaudeville entertainment has been arranged for by the entertainment committee.

## INTERSTATE COMMERCE COMMISSION.

The commission began at Washington last week a re-hearing on the case involving rates on lemons in carloads from California to eastern cities, the Commerce Court having annulled the former decision of the Interstate Commerce Commission reducing these rates from $1.15 to $1.

Commissioner Prouty took testimony in New York City on Monday of this week in a complaint that rates on watermelons in carloads from the southern states to New York and other eastern cities are excessive. Previous to 1902 the Pennsylvania Railroad delivered watermelons in New York City, but since that date has refused to carry them across the river in cars (on floats), requiring consignees to accept delivery at Jersey City; the rate to Jersey City being 1 cent per 100 lbs., less than the former rate to New York. The melon men claim that some dealers in New York have had to go out of business because of the change of the delivery point from New York to Jersey City. The consignees also complain of congestion of watermelon shipments in Jersey City, though it appears that the railway has delivery tracks there which will permit the unloading of 70 cars a day.

The commission on November 17 ordered a reduction in freight rates from the Mississippi river crossings to Missouri river cities from 60 cents (first class) per 100 lbs., to 55 cents, all of the classes, including the lettered classes, being reduced proportionately. This action was taken in the Burnham-Hanna-Munger case, which arose several years ago and which has been before the commission and courts repeatedly. The rates here dealt with are proportions of through rates from the Atlantic seaboard and other eastern points. The commission originally ordered a reduction from 60 to 51 cents. The United States Circuit Court at Chicago annulled this order, and the suit was then taken to the United States Supreme Court, which reversed the Circuit Court and established the rates fixed by the commission. But by this time the two-year term of the commission's order had nearly expired, and so the railways restored the higher rates. The shippers then entered a new complaint and the commission suspended the tariffs while it should make a complete new inquiry. It was asserted by the defendants that the commission's rate would cause a reduction in revenues on freight moving from east of the Mississippi river to the Missouri river and St. Paul, and including territory intermediate and basing on the Missouri river and on St. Paul, amounting to $1,200,000, or $870,000 on the first five classes. The commission does not take the ground that the rates are extortionate, but holds they are not proportionate, and therefore not reasonable. Uniform rates applicable as parts of the through rates on shipments from all points east of the Indiana-Illinois state line from the Mississippi river crossings to the Missouri river cities are prescribed. Reparation on past shipments is denied. The order goes into effect December 30, and continues in force for two years.

### Pay for Repairing Cars Forbidden.

*Balfour, Guthrie & Company et al. v. Oregon-Washington Railroad & Navigation Co. Opinion by Commissioner Lane:*

Complainants ask that defendant be required to provide in its tariffs for reimbursement of shippers for repairs made on cars to fit them to hold grain in bulk. Such an arrangement would be susceptible of use as a subterfuge for granting rebates, and shippers should refuse to accept cars that are in such a state of disrepair as to render them unfit for use. Complaint dismissed. (21 I. C. C., 539.)

### The Right to Know Probable Future Rates.

*Leon E. Lum v. Great Northern Railway Company. Opinion by Commissioner Meyer:*

The defendant moved to dismiss the complaint without further hearing, for a number of reasons, among which was one based on the two-year provision of the law. The commission does not regard as material the allegation that complainant could not possibly ship ore within two years of the effective period of an order of this commission. If the commission prescribes a reasonable rate today for the movement of traffic which possibly may not move within two years, and the railway company refuses to continue that rate voluntarily for a period longer than two years, it becomes the plain duty of the commission to institute a new investigation at the proper time and prescribe a rate which shall be just and reasonable under the circumstances and conditions prevailing at such time. Any man who is situated as is this complainant has a right to know what the lawful published rate on his proposed product is and will be for a reasonable period of time in the future. The commission can not deny the right of the complainant to secure the publication of a rate in advance of far-reaching and consequential business arrangements which can be profitably made when predicated upon one rate, and which can not possibly be made on a commercial basis when predicated upon a higher rate. The motion is overruled and the case will proceed to a determination in accordance with the act. (21 I. C. C., 558.)

## STATE COMMISSIONS.

W. A. Spalding, assistant engineer of the Galveston, Harrisburg and San Antonio at Houston, Tex., has been appointed assistant engineer of the California Railway Commission.

As a result of the investigation of Commissioner H. H. Sanborn, the California State Railroad Commission has ordered a reduction in the freight tariff on dried fruit from San Joaquin Valley points to San Francisco. The present rates, placed in effect in September, 1910, are reduced approximately one-half. The new tariff is to become effective immediately, and varies from 85 cents per ton from Fresno, to $3.97 per ton from Bakersfield and points in the vicinity.

## COURT NEWS.

An appeal to the Supreme Court of the United States has been filed by the government from the ruling of the Commerce Court granting a temporary injunction in the intermountain rate cases.

In the federal court at New York City, November 16, the grand jury returned indictments against two officers of the Lehigh Valley and one of the Baltimore & Ohio, and against seven freight shippers or brokers, on the charge of giving or accepting illegal rebates. It is charged that shipping brokers in New York City have been allowed a 10 per cent. commission on import shipments controlled by them and that these commissions, in whole or in part, go to the owner of the goods, thus constituting an illegal discount from the tariff rate. The railways claim that the broker or forwarding agent is the agent of the railway company, while the government aims to show that he is the agent of the shipper.

### New York Public Service Commissions Law Interpreted.

The Court of Appeals of the state of New York has annulled the decision of the Public Service Commission, First district, that the reorganization of the Third Avenue (surface street)

Railroad Company of New York City, now in the hands of a receiver, can be carried out only according to a plan approved by the commission. The commission has twice rejected plans proposed by the bondholders and other interests connected with the company, but the court now allows the last of these plans to be carried out regardless of the action of the commission.

Under the plan new securities amounting to $54,916,000 were to be issued to take the place of $70,028,800 old securities. The Public Service Commission denied permission to issue the new securities on the ground that the capitalization proposed was not justified by the value of the property. The court declares that the reorganization was no concern of the Public Service Commission as long as the securities proposed to be issued did not exceed the face value of the securities already in existence. The statutory provisions for the reorganization of corporations, embodied in sections 9 to 12 of the stock corporation law, have not been repealed as to railway corporations by the provisions of the Public Service Commission's law, nor do the provisions of the stock corporation law relieve corporations formed by reorganization from compliance with section 55 of the Public Service Commission's law.

It is not necessary for the reorganized corporations first to obtain the permission and approval of the commission under section 53 of the Commission's law, before it may exercise the rights, privileges and franchises of the predecessor railway, nor is it necessary for such company first to obtain the approval of the Public Service Commission under section 54 of such law, to enable a lawful transfer to it of the franchises, etc.

"The requirement of the statute," says Judge Cullen, "is that the issue of the securities shall be necessary for the acquisition of the property, and although as a general rule under this requirement, the securities should not be authorized except where the value of the property is equal to the amount of securities issued, there may be exceptions to the rule. One is found in the statute itself.

"Thus, in the case of a merger the limit of the amount of stock of a corporation is dependent, not on the value of its property, but on the stock outstanding of the constituent corporations prior to the merger. We think the same rule is applicable to the case of a corporation formed on the reorganization of a foreclosed railway.

"We do not say that in the reorganization of a railway the new corporation is authorized to issue securities in excess of those of the company to whose property and franchises it has succeeded and the new money or property that may be put in the enterprise. Such a plan would be plainly inconsistent with the spirit of the Public Service Commissions law against the issue of 'watered' stock or bonds; but up to the limit we have named, the new corporation has the right to issue securities. The determination of the commission to the contrary was therefore erroneous."

## FOREIGN RAILWAY NOTES.

The government of Colombia has recently paid to the Antioquia Railroad $40,000 as subsidy for 2½ miles of line recently opened to public traffic.

Another section of the Amaga Railroad, Colombia, was opened to public traffic on July 20. This new section lies between Envigado and Sabaneta.

The Paulista Railway, Brazil, proposes to construct a double line from Jundiahy to Campinas, near Sao Paulo, to be later extended as far as Rio Claro.

Some railways in Germany are equipping their locomotive cabs with cocoa mats to absorb the vibration, which is said to affect the hearing of the enginemen.

The Cordoba Central Railway, Argentina, has extended its passenger service to Buenos Aires, thereby placing the capital of the republic in direct rail communication with Tucuman, via Rosario.

It is planned to extend the railway now running from Buenos Aires, Argentina, to Resistancia on the Parana river, about 180 miles north of Puerto Pilcomayo. This extension will necessitate the inauguration of a railway ferry service between Puerto Pilcomayo and Asuncion, Paraguay.

# Railway Officers.

## ELECTIONS AND APPOINTMENTS.

### Executive, Financial and Legal Officers.

Charles H. Dietrich has been appointed assistant freight claim agent of the Chicago, Milwaukee & St. Paul, with office at Chicago.

S. G. McMeen, of Chicago, has been elected president of the Mount Hood Railway & Power Company, a road in Oregon extending from Portland to the base of Mount Hood.

J. P. O'Brien, vice-president and general manager of the First district of the Oregon-Washington Railroad & Navigation Company, and general manager of the Southern Pacific lines in Oregon, has been appointed vice-president and general manager of all lines of the Oregon-Washington Railroad & Navigation Company, with office at Portland, Ore.

J. L. Parris, assistant attorney for Iowa and South Dakota of the Chicago, Rock Island & Pacific, has been appointed attorney for Iowa, with office at Des Moines, Iowa, succeeding Carroll Wright, deceased. Stringer & Seymour, attorneys for Minnesota, with office at St. Paul, have been appointed also attorneys for South Dakota, that state having been under the jurisdiction of Mr. Wright until the time of his death.

Reuben Wells Leonard, who was recently elected chairman of the Commissioners of the Transcontinental Railway, with headquarters at Ottawa, Ont., as has already been announced in these columns, was born in 1860, at Branford, and graduated from the Royal Military College, Kingston, in 1883. He was then for two years employed on survey and construction work for the Canadian Pacific in the Lake Superior district, and the latter part of 1885 was resident engineer of that road in Manitoba. He was later engineer on surveys and construction on the Ontario and Quebec divisions of the same road, and from 1887 to 1890 was chief engineer of the Cumberland Railway & Coal Co. of Springhill, N. S. From 1890, to 1906, he was engineer on the Canadian Pacific in Quebec, Ontario and British Columbia and of the following works: Engineer, in charge of construction hydro-electric plant of the Niagara Falls Park & River Railway Company; contracting engineer of the Ottawa & Parry Sound Railway; chief engineer in charge of construction of the Canadian Pacific short line, Montreal, Que., to Ottawa, Ont.; chief engineer of the St. Lawrence & Adirondack, of the New York Central Lines, in charge of surveys and construction in Quebec; consulting engineer of the Rutland-Canadian Railway, in charge of surveys and construction; engineer in charge of iron and nickel mining for the Lake Superior Corporation; chief engineer of the Cape Breton Railways, surveys and construction; engineer in charge of construction for the Hamilton Cataract Power Company's hydro-electric plant at St. Catharines, Ont.; also of the Kamanistiquia Power Company at Kakabeka Falls. Since 1906 he has been president of the Coniagas Mines, Ltd., and of the Coniagas Reduction Company, Ltd. Mr. Leonard is a member of the board of governors of the Toronto University; Kingston School of Mining; Wycliffe College, Toronto; Bishop Ridley's College, St. Catharines; vice-president of the Canadian Mining Institute, and was formerly vice-president of the Canadian Society of Civil Engineers. He is a member of council of the Institute of Mining and Metallurgy, London, England; also a member of the American Institute of Mining Engineers.

### Operating Officers.

T. J. Brown has been appointed chief train despatcher of the Grand Trunk, with office at Durand, Mich.

J. H. Curtis has been appointed acting car distributor of the Bangor & Aroostook, with office at Bangor, Me., succeeding G. V. Thompson, resigned.

F. C. Dow has been appointed chief despatcher of the Coast division of the Chicago, Milwaukee & Puget Sound and the Tacoma Eastern, succeeding E. G. Fowler.

C. J. Steinel has been appointed superintendent of telegraph of the San Pedro, Los Angeles & Salt Lake, with office at Los Angeles, Cal., succeeding I. T. Dyer, deceased.

W. F. Braggins, general agent of the Texas & Pacific at New Orleans, La., has been appointed superintendent of terminals, with office at Dallas, Tex. P. L. Wing, freight agent at New Orleans, has been appointed superintendent of terminals at that place.

E. B. Cook, division superintendent of the Lake Shore & Michigan Southern at Chicago, has been appointed division superintendent, with office at Cleveland, Ohio, succeeding J. K. Russell, retired on a pension, effective December 1. F. M. Smith, assistant division superintendent at Chicago, succeeds Mr. Cook.

Guy Adams, who has been appointed manager of mail traffic of all the Frisco Lines, effective January 1, as was announced in these columns last week, was a postal clerk, and held other positions in the government railway mail service for 15 years. He was for a time general baggage agent of the Union Pacific, Denver & Gulf, now the Colorado & Southern, was later employed in the operating department of the Chesapeake Beach at Washington, D. C., and subsequently was made traveling passenger agent of the Lehigh Valley. He went to the Delaware, Lackawanna & Western in 1899 as division passenger agent at New York. In 1904 he was appointed supervisor of mails of the Chicago, Rock Island & Pacific, and in 1906 had his jurisdiction extended over the Chicago & Eastern Illinois, the Evansville & Terre Haute, and the St. Louis, Kansas City & Colorado, now part of the Frisco system. In 1909 his jurisdiction was extended over the St. Louis & San Francisco proper, and in 1910 his title was changed to manager of mail traffic, since which time he has had jurisdiction over the Chicago, Rock Island & Pacific, the St. Louis & San Francisco and the Chicago & Eastern Illinois. For five years he has been chairman of the committee on railway business mail of the American Railway Association, which has formulated the rules now in effect on the leading railways of the country for the handling of railway business mail.

Guy Adams.

Joseph Lindsay, who has been appointed superintendent of the Great Northern, with office at Sioux City, Iowa, as has been announced in these columns, was born May 20, 1859, at Durham, Ont. He was educated in the country schools of Ontario and began railway work in March, 1883, with the Canadian Pacific on construction work through the Rocky mountains. He remained with that company five years, having been in the building department and in train service as well as on construction work. He then went with the Great Northern, where he was for seventeen years in the bridge and building department, with headquarters at Superior, Wis., having been consecutively carpenter, foreman carpenter and master carpenter. He was transferred to the operating department on April 20, 1911, when he was appointed trainmaster on the Butte division, and he was promoted to superintendent as above on November 1.

D. W. Campbell, whose appointment as general superintendent of the Shasta and Portland divisions of the Southern Pacific, with office at Portland, Ore., has been announced in these columns, was born November 11, 1867, at Hanover, Can. He spent ten years in school and began railway work in June, 1882, with the Grand Trunk. In November of that year he went with the Canadian Pacific as train despatcher, and in April, 1887, was appointed to a similar position on the Northern Pacific, where he remained almost four years. He then went with the Oregon Railroad & Navigation Company and remained with that company and its successor, the Oregon-Washington Railroad & Navigation Company, until the time of his recent appointment, having been consecutively train despatcher, chief despatcher, assistant superintendent, superintendent and general superintendent; his last title with that company was assistant general manager.

James A. McCrea, whose appointment as general manager of the Long Island Railroad, with office at New York City, has been announced in these columns, was born on May 26, 1875, at Philadelphia, Pa., and was educated at St. Paul's school at Concord, N. H., 1888-1892, and graduated from Sheffield Scientific School of Yale University in 1895, with the degree of Ph.B. Mr. McCrea began railway work on November 5, 1895, as a rodman in the engineering department of the Pennsylvania Lines West of Pittsburgh. He was later in the maintenance of way department on the Cincinnati & Pittsburg division, and from May, 1897, to May, 1898, was on the Philadelphia division. He was appointed assistant engineer of the Eastern division in May, 1898, and in August of the following year, became engineer of that division. From June, 1901, to January, 1906, he was superintendent of the Cincinnati division, and was then appointed general superintendent of the Long Island Railroad, which position he held at the time of his recent appointment as general manager of the same road.

### Traffic Officers.

A. G. Bantly has been appointed commercial agent of the Chicago, Milwaukee & Puget Sound, with office at Everett, Wash.

M. A. Johnson has been appointed soliciting freight agent of the Cleveland, Cincinnati, Chicago & St. Louis, with office at Evansville, Ind.

H. P. Salter, general agent of the Louisville & Nashville at Anniston, Ala., has been appointed freight agent, with headquarters at Nashville, Tenn.

C. A. Silkern has been appointed freight soliciting agent of the Southern Railway, with office at Nashville, Tenn., succeeding H. E. Woodworth, promoted.

J. T. Crawford, traveling passenger agent of the Chicago, Rock Island & Pacific at Peoria, Ill., has been appointed traveling passenger agent, with office at Chicago.

Harvey E. Lounsbury, whose appointment as general freight agent of the Southern Pacific Company's lines in Oregon, with office at Portland, Ore., has been announced in these columns, was born February 2, 1873, at Deer Lodge, Mont. He attended the public schools, and began railway work in 1887 with the Oregon Railroad & Navigation Company, as an office boy for the general passenger agent. During the time he was with that road he studied shorthand at night school, and in 1891 was made stenographer and clerk in the office of the manager of the Southern Pacific lines in Oregon. He was then consecutively passenger clerk, traveling freight agent, and district freight agent of the Southern Pacific; general agent in the freight department of the O. R. & N. and the Southern Pacific and district freight agent of the latter company, with office at Portland. He was appointed assistant general freight agent of both companies in November, 1910, from which position he is now promoted.

H. E. Lounsbury.

P. M. Ripley has been appointed assistant general traffic manager of the El Paso & Southwestern System and the Morenci Southern Railway, with office in New York City.

J. G. Lowe, until recently general agent of the Union Pacific at St. Louis, Mo., has been appointed traveling passenger agent of the Western Pacific, with office at Kansas City, Mo.

W. H. Winnfield has been appointed soliciting freight agent of the Frisco Lines, with office at Dallas, Tex., succeeding W. M. Bottorff, resigned to accept service with another company.

A. J. O'Reilly, commercial agent of the Chicago, Indianapolis & Louisville at Indianapolis, Ind., has been appointed general agent of the freight department, with headquarters at Indianapolis.

H. J. Schwietert has been appointed traveling industrial and immigration agent of the Illinois Central, with office at Memphis, Tenn., succeeding Frank Henius, resigned, to engage in other business.

R. L. McKee, traveling freight agent of the Louisiana Railway & Navigation Company, at Little Rock, Ark., has been appointed commercial agent, with office at Little Rock, and his former position has been abolished.

F. M. Martin has been appointed traveling freight agent of the Lake Erie & Western, the Fort Wayne, Cincinnati & Louisville and the Northern Ohio, with office at Indianapolis, Ind., succeeding F. S. Wills, resigned.

A. M. Hall, traveling passenger agent of the Missouri, Kansas & Texas of Texas at Dallas, Tex., has been transferred to Victoria, Tex., and R. G. Buford, traveling passenger agent at San Antonio, Tex., succeeds Mr. Hall. V. B. O'Neal, depot passenger agent at San Antonio, succeeds Mr. Buford.

#### Engineering and Rolling Stock Officers.

W. S. Crites has been appointed division engineer of the Southern Pacific Company, with office at Los Angeles, Cal., succeeding F. L. Burckhalter, promoted.

H. M. Church has been appointed engineer maintenance of way of the Wheeling System of the Baltimore & Ohio, with office at Wheeling, W. Va., succeeding J. A. Spielmann, promoted.

G. Mihleison, assistant general boiler inspector of the Atchison, Topeka & Santa Fe at Topeka, Kan., has been transferred to the Coast lines of the Santa Fe. J. K. Nimmo has been appointed assistant general boiler inspector of the eastern lines, at Topeka, and George C. Nichol, foreman of the boiler shop at Albuquerque, N. Mex., has been appointed assistant general boiler inspector of the western lines, in charge of the Northern and Southern districts, with office at Albuquerque.

### OBITUARY.

A. A. Hayes, freight auditor of the Atchison, Topeka & Santa Fe, at Topeka, Kan., died at that place on November 20, from blood poisoning that resulted from a gunshot wound.

John W. Dana, formerly treasurer and auditor of the Portland & Ogdensburg, now the mountain division of the Maine Central, died at Portland, Me., at the age of 68 years.

W. H. Hill, until the middle of October assistant general freight agent of the Chicago, Burlington & Quincy at Kansas City, Mo., and recently in the office of the president of that road, died at Burlington, Iowa, on November 20 at the age of 42 years.

John J. Ryan, superintendent of motive power of the Galveston, Harrisburg & San Antonio and other Harriman Lines in Texas, with office at Houston, died on November 20. Mr. Ryan was born on July 1, 1849, at East Boston, Mass., and was educated in the public schools. He was an apprentice at the McKay & Aldus Locomotive & Marine Works, and began railway work in 1870 with the New York & Lake Erie. He was then previous to 1877 consecutively with the Rhode Island Locomotive Works, the Ames Tool Co., the New York & Erie, the Eastern Railroad, the United States Navy Yard, the Pennsylvania Railroad, the Delaware, Lackawanna & Western and the Aldus Engine Works. From March, 1877, to January, 1883, he was with the Galveston, Harrisburg & San Antonio, consecutively as a machinist, foreman engineer and general foreman, and was appointed master mechanic of the same road in February, 1883. He became master mechanic in March, 1885, of the Atlantic system of the Southern Pacific Co., and from January, 1886, to October, 1895, was general master mechanic. Since October 1, 1895, he had been superintendent of motive power of the Galveston, Harrisburg & San Antonio.

# Equipment and Supplies.

### LOCOMOTIVE BUILDING.

The Chicago & North Western is in the market for 75 locomotives.

The Illinois Terminal Company has ordered 1 mogul locomotive from the Baldwin Locomotive Works.

The Wabash, Chester & Western has ordered one eight-wheel locomotive and one mogul locomotive from the Baldwin Locomotive Works.

### CAR BUILDING.

The Chesapeake & Ohio is in the market for 250 steel underframes.

The Harriman Lines are figuring on from 12,000 to 40,000 freight cars.

The Chicago & North Western is in the market for 3,300 box cars.

The Erie has ordered 25 milk cars from the American Car & Foundry Company.

The Atchison, Topeka & Santa Fe is said to be figuring on 8,000 cars. This is not yet confirmed.

The San Antonio & Aransas Pass is in the market for 100 steel underframes for reinforcing box cars.

The Castle Valley Coal Company, Salt Lake City, Utah, is making inquiries for 200 all steel coal cars.

The Lehigh Valley has ordered 30 coaches, 20 smoking cars and 2 dining cars from the Pullman Company.

The Live Poultry Transportation Company, Chicago, is in the market for 250 steel underframe poultry cars.

The Buffalo, Rochester & Pittsburg has ordered 1,000 steel underframes from the Pressed Steel Car Company.

The Norfolk & Southern is said to have increased its inquiry for 500 box cars to 1,000 box cars. This item is not confirmed.

The Maxton, Alma & South Bound, Alma, N. C., is in the market for 2 box cars, 2 flat cars, 1 combination passenger and baggage car, 1 combination mail and baggage car and 1 caboose.

The Canadian Pacific has ordered 4,500 box cars, to be divided as follows: 2,500, Canadian Car & Foundry Company; 1,000, Pressed Steel Car Company; 1,000, American Car & Foundry Company.

The New York Central Lines have ordered 4,000 box cars and 1,000 hopper cars in addition to the equipment mentioned in the *Railway Age Gazette* of November 17.

### IRON AND STEEL.

The Chesapeake & Ohio is in the market for 1,000 tons of bridge steel.

The San Antonio & Aransas Pass is in the market for 20,000 tons of rails.

The Atlantic Coast Line has ordered 12,000 tons of rails from the Carnegie Steel Company and 7,000 tons from the Maryland Steel Company.

The Philadelphia & Reading has divided an order for 15,000 tons of rails between the Pennsylvania Steel Company and the Bethlehem Steel Company. Part of these rails will be used on the Central of New Jersey.

General Conditions in Steel.—The steel industry has shown little change during the past two weeks, but a drastic change is expected before the end of the year. Steel men feel that the recent large equipment orders are only the beginning of a long succession of large orders which railways will now be compelled to place. Many manufacturers are bullish and feel that there will be a sharp rise in prices in the near future.

# Supply Trade News.

E. L. Pollock, formerly vice-president and general purchasing agent of the Rock Island Lines, has gone to the Safety Car Heating & Lighting Company, New York, with office in Chicago.

The Jeffrey Manufacturing Company, Columbus, Ohio, has opened a branch office in the American Bank building, Seattle, Wash. Percy E. Wright, who has been for a number of years in the sales department, has been made manager of the Seattle office. The Jeffrey company now has 13 branch offices in the United States, as well as nearly 100 agencies in the leading commercial centers of the world.

The Youngstown Sheet & Tube Company, Youngstown, Ohio, has placed an order with the Mesta Machine Company, Pittsburgh, Pa., for one twin, tandem-compound, reversing-type engine with 44-in. and 76-in. x 60-in. stroke, and an order with the William Tod Company, Youngstown, for one manipulator. This equipment will be used in the new open-hearth steel works and finishing mills which this company is building at Youngstown.

The Remy Electric Company, Anderson, Ind., builders of magnetic ignition and lighting devices for all types of gas engines and gasoline motor-driven vehicles, which recently absorbed the American Electric Headlight Company, Indianapolis, and now makes the American electric headlight for steam locomotives, has bought all patents, designs, good will and manufacturing rights of the Peters electric headlight for steam locomotives. The locomotive headlight departments of the R. G. Peters Company, Grand Rapids, Mich., have been moved to Anderson, and the Peters headlight will be made and sold by the Remy company. New buildings will be erected at the Anderson plant for this purpose. The Remy company will employ the principal men heretofore employed by the Peters company in its headlight department. The designs and patents of both the Peters and the American companies will be used in making the headlights of the Remy company.

George W. Hebard, acting vice-president of the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., died at his home in New York on November 17. Mr. Hebard was born in Barre Centre, N. Y., in 1845 and was educated at the Albion Academy, Albion. He came to New York in 1869 and became identified with the early history of the manufacture of electrical apparatus, becoming president of the United States Electric Lighting Company, Newark, N. J., in 1882. Later, as president of the United Electric Light & Power Company, he was closely affiliated with the introduction of the Westinghouse alternating current system in New York by means of the overhead system. At the time the United States company was taken over by the Westinghouse company, Mr. Hebard was president of the United States company, and in the re-organization was made vice-president of the Westinghouse company; and, in 1888, when this company took over the Sawyer-Man Electric Company, Mr. Hebard was given charge of the newly acquired organization. Mr. Hebard was a director in several corporations, including the Bridgeport Gun Implement Company, Bridgeport, Conn., and the Union Metallic Cartridge Company, Bridgeport. He was a member of the Chamber of Commerce, the Lawyers' Club of Manhattan and the Brooklyn Union League Club.

## TRADE PUBLICATIONS.

OKONITE JOINTS.—The Okonite Company, New York, has published a useful little folder, under the title, Economy in Joint Making, with Instructions, which gives information on insulating and protecting joints to avoid short circuits.

RAILWAY SUPPLIES.—The Railway Equipment Company, Portland, Ore., has issued a booklet entitled From Spike to Locomotive, which contains an index of all the railway supplies handled by this company.

SAN PEDRO, LOS ANGELES & SALT LAKE.—The passenger department of this company has issued a 32-page booklet called California Today, which contains views and descriptions of the beauty spots in California along the line of this road. An index of the hotels in the principal cities is also given.

# Railway Construction.

### New Incorporations, Surveys, Etc.

AKRON, CANTON & YOUNGSTOWN.—An officer writes that work is now under way from Britain, Ohio, to Akron, four miles, and from Erie Junction to East Akron, one mile. The P. T. McCourt Company, Akron, has the contract. The line is to be extended east via Mogadore to Youngstown, 42 miles. F. E. Bissell, chief engineer, Canton, Ohio. (June 9, p. 1333.)

ALTUS, LUBBOCK & ROSWELL.—An officer writes that surveys have been made from Lubbock, Tex., to Roswell, N. M., and work is now under way on 80 miles by M. J. Hurley, Silverton, Tex., between Memphis, Tex., and Lubbock. A. B. Thurston, chief engineer, Houston, Tex. (November 10, p. 975B.)

AMERICAN TRACTION & POWER CO.—Incorporated with $500,000 capital and office at Wilmington, Del., to build electric railways in Indiana. H. C. Brubaker, president; George E. Bruce, secretary, 1233 Oakland avenue, Indianapolis, Ind.

ARGENTINE CENTRAL.—An officer writes that an extension is to be built from Waldorf, Colo., to Keystone, 17 miles. E. J. Tuttle, general manager, Denver, Colo.

ARKANSAS VALLEY RAILWAY, LIGHT & POWER COMPANY.—Incorporated in Colorado with $10,000,000 capital, and office at Pueblo. The plans call for building an interurban line from Canon City, Colo., east to Pueblo, about 40 miles, and eventually through the Arkansas valley to the Colorado-Kansas state line, in all about 200 miles. The incorporators include T. W. Devine and W. F. Raber of the Pueblo & Suburban Traction & Light Company, Pueblo, and F. W. Insull.

ATCHISON, TOPEKA & SANTA FE.—A contract for the construction of a branch line from Corona, Cal., to a point in the Temescal canyon, has been let to Oscar Ford, Corona.

BATESVILLE SOUTHWESTERN.—An officer writes that a contract has been let to J. B. Lewis, Batesville, Miss., to build a logging road from Batesville, southwest, about 17 miles. Track laying is half finished. There will be one steel bridge and several short trestles. R. J. Darnell, lessee, Memphis, Tenn. (August 11, p. 303.)

BELLINGHAM, MT. BAKER & SPOKANE.—This company will soon commence the construction of a line, it is said, along the middle fork of the Nooksack river, in Whatcom county, Wash. The company has filed a deed at Bellingham, Wash., showing its right of way. The company was organized to build from Bellingham, southeast via Deming to Glacier, thence to the headwaters of the north fork of the Nooksack river. Joseph Morrison, president, and C. E. Wright, chief engineer, Bellingham. (August 11, p. 303.)

BUCKHANNON & NORTHERN.—An officer of the Monongahela Railroad writes that work is now under way by McMenamin & Sims, Philadelphia, Pa., from Martin, to the Pennsylvania-West Virgina state line, 8.4 miles.

CANADIAN NORTHERN.—A contract has been given to John Twohy Brothers, Portland, Ore., it is said, for the construction of 100 miles of line from a point about 50 miles north of Kamloops, B. C.

CANADIAN PACIFIC.—The Colonsay sub-division is now in operation from Regina to Colonsay, 133.1 miles. J. G. Sullivan, chief engineer, Winnipeg, Man.

CHERRYVALE, OKLAHOMA & TEXAS.—An officer writes that work is now under way by the Continental Construction Company, Caney, Kan., from Caney, Kan., southeast to Vinita, Okla., 62 miles. An extension is projected from Vinita to Siloam Springs, Ark., 60 miles. B. J. Dalton, chief engineer, Lawrence, Kans. (May 12, p. 1133.)

CHICAGO & EASTERN ILLINOIS.—See St. Louis & San Francisco.

EASTERN MAINE.—An officer writes that this company is starting out two surveying crews between Bangor, Me., and Houlton, which are 108 miles apart, and expect to have the surveys finished by January next. The proposed route from Bangor is via Holden and East Eddington, thence via Amherst Township and Great Pond, then to the head of Nickatous lake, thence via

Lakeville plantation, Dobsis lake, through Carroll and Prentiss to Bancroft, thence via Haynesville, Orient, Amity, Cary plantation and Hodgdon to Houlton. The new line will open up a large undeveloped section of timberlands in Maine. George W. Maxfield, president; F. O. Beal, treasurer; Frederic Danforth, chief engineer, Bangor. H. P. Sargent, Brewer, and W. H. Taylor, New York, are directors. (August 11, p. 304.)

Grafton, Fairmont & Clarksburg (Electric).—An officer writes that it has not yet been decided when contracts will be let to build from Grafton, W. Va., via Pruntytown, Meadland and Boothsville to Fairmont, 32 miles, with a branch from Boothsville to Bridgeport, 7 miles. The work will be light and calls for the excavation of 15,000 cu. yds. a mile. Maximum grades will be 4 per cent. and maximum curvature 20 degrees. There will be three long, high bridges of deck truss design. One is to be 400 ft. long, another 600 ft. and the third 1,250 ft. In addition there will be four bridges, each 60 ft. long; also three trestles, each 300 ft. long. Charles F. Sutherland, president, Morgantown, W. Va., and H. M. Fry, chief engineer, Fairmont.

Great Southern.—An officer writes that the plans call for building an extension from Dufur, Ore., to Juniper Flats, 40 miles, and that grading has been finished from Dufur southwest to Friend, 11 miles. The work is being carried out by the company's men. John Heimrich, president, Portland. (May 5, p. 1084.)

Greenville, Spartanburg & Anderson.—An officer writes that work is now under way by W. J. Oliver, Knoxville, Tenn., on the section from Greenwood, S. C., north to Greenville, 61 miles. E. Thomason, general manager, Charlotte, N. C. (June 23, p. 674.)

Hudson & Manhattan.—See an item under General News regarding the opening of the New York-Newark, N. J., line.

Idaho Northern Railway.—An officer writes that contracts have been let to the Utah Construction Company, Ogden, Utah, and grading work is now under way on 56 miles of the extension from Emmett, Idaho, north along the Payette river. Track has been laid on five miles. Twenty miles of the work is through a rocky canyon. Maximum grades will be 2½ per cent.; maximum curvature, 1 degree. There will be four tunnels, each about 400 ft. long. The line is to be continued along the Payette river to a point about 103 miles from Emmett. The company expects to develop a traffic in timber, grain and livestock. J. H. Smith, engineer, Nampa, Idaho. (August 11, p. 304.)

Jefferson & Northwestern.—An officer writes that this company has projected an extension of 12 miles from the present end of track at Mile 31 to Naples, Tex. Address H. B. Montgomery, Jefferson, Tex.

Louisville & Nashville.—See St. Louis & San Francisco.

Madison County.—An officer writes that this company is planning to build an extension from Allanstand, N. C., to the North Carolina-Tennessee state line, about five miles. W. N. Garrett, vice-president, Stackhouse, N. C. (March 3, p. 433.)

Missouri, Oklahoma & Gulf.—An officer writes that work is now under way by J. W. Hoffman & Co., Dewar, Okla., from Coalton to Deep Fork, four miles, and surveys have been made for an extension from Henryetta, west to Oklahoma City, about 102 miles. J. J. Harrison, chief engineer, Muskogee, Okla. (October 27, p. 860.)

Mexican Roads.—Announcement has been made by the federal government that a railway is to be built, it is said from Balsas, Guerrero, Mex., to Zihuataneios, about 225 miles. It is understood that the project will be financed with private capital. The names of the promoters are not given.

Mississippi Roads.—An officer of W. P. Dickinson & Co., Chicago, writes that the company is interested in financing a railway, on which construction work has begun between Memphis, Tenn., and Pensacola, Fla., via Meridian, Miss., about 300 miles. A branch is to be built from this line at a point near Chester, Miss., northwest to Helena, Ark., about 125 miles. The line has been surveyed, the route located, and most of the right-of-way secured, and much of the financing has been arranged for. The company has already located its terminals. Maximum grades will be 1.5 per cent.; 85-lb. rail will be used.

Monongahela Railroad.—See Buckhannon & Northern.

Nebraska, Kansas & Southern.—An officer writes that this company has located an extension from the present end of track to Stockton, Kans., about 150 miles. The company was organized to build from Garden City, northeast to Stockton, about 165 miles, and track has been laid from Garden City east, about 15 miles. Baxter L. Brown, chief engineer, 610 Laclede building, St. Louis, Mo.

New York Central & Hudson River.—Permission has been granted this company to abolish two freight yards and stations at Spuyten Duyvil, N. Y., upon the opening of a new yard with a greater capacity at Kingsbridge. An officer writes that plans for a new yard at Kingsbridge have not yet been fully developed. Most of this work is to be carried out by the company's forces. G. W. Kittredge, chief engineer, New York.

New York Subways.—The New York Public Service Commission, First district, has rejected all bids on the sections of the Lexington avenue subway, from the Battery north to a point between Houston and Bleecker streets, and the section which runs under the Harlem river.

North Carolina Interurban.—An officer writes that this company expects to let contracts before January 1 to build from Gastonia, N. C., northwest to Cherryville, continuing in a westerly direction via Shelby, Cliffside, Rutherfordton, Chimneyrock, Bat Cave and Baltimore to Asheville, about 90 miles. East of Rutherfordton the work will be easy, and between that place and Chimneyrock there will be some rock work. West of Chimneyrock there will be heavy rock work on 15 miles. There will be three steel bridges, each 100 ft. long, and four trestles. The plans include the construction of three hydro-electric power houses, dams and plant. The company expects to develop a traffic in cotton, cottonseed, cotton mill products, timber, farm products, coal and general merchandise. W. A. Harrill, president, Rutherfordton.

Northumberland County Traction.—An officer writes that this company has given a mortgage to secure funds for building an electric line in Northumberland county, Pa. The company has been granted franchises to build from Sunbury, northeast to Wilkesbarre, about 60 miles; also from Sunbury north to Williamsport, 35 miles. Track has been laid from Sunbury north to Northumberland, about three miles. D. A. Howe, president; G. Parkman, secretary; W. H. Bloom, treasurer, and R. V. West, superintendent. The offices are at Sunbury.

Orangeburg Railway.—An officer writes that work is now under way from Orangeburg, S. C., northwest to North 17 miles. William C. Wolfe, president, Orangeburg.

Oregon Roads.—The Randolph Lumber Company is building a line from Parkersburg, Ore., along Bear creek, for about 7 miles. It is understood that the line will eventually be extended to other points in that district.

Pennsylvania Railroad.—See an item under General News regarding the opening of the New York-Newark, N. J., line; also another item regarding the change of location and elimination of grade crossings at Bristol, Pa.

Pittsburgh & Lake Erie.—See Western Maryland.

Raleigh & Charlotte.—Surveys have been made for a line to be built in North Carolina. J. M. Barr, former president of the Seaboard Air Line, and E. C. Duncan, of Raleigh, N. C., are back of the project.

Randolph & Cumberland.—An officer writes that this company has projected an extension from McConnell, N. C., to Elkin, 100 miles. T. L. Riddle, secretary, Carthage, N. C.

Rawhide Western Railway.—An officer writes that all of the grading work has been finished from Walker lake, Nev., northeast to Rawhide, 31 miles. Track has been laid on 350 ft. for a connection at the junction with the Southern Pacific. Charles Wesley Reed, Clause Spreckles building, San Francisco, Cal., is back of the project. R. E. Tilden, chief engineer, Winnemucca, Nev.

Salisaw, McAlester & Southern.—An officer writes that work is now under way between Coalgate, Okla., and McAlester, 30 miles. The plans call for a line from Salisaw southwest to

McAlester, thence to Honey Grove, Tex., about 190 miles with a number of branch lines. M. J. Smith, chief engineer, McAlester, Okla.

SAND SPRINGS INTERURBAN.—An officer writes that this company has track laid on the line from Tulsa, Okla., west to Sand Springs, 8 miles, and has projected an extension from Tulsa, northeast to Collinsville, about 20 miles. W. H. Hendron, chief engineer, Tulsa. (June 30, p. 1714.)

SAN FRANCISCO, NAPA & CALISTOGA.—Incorporated in California, with $2,000,000 capital and headquarters at San Francisco. The incorporators include: T. V. Maxwell, G. C. Earl, N. H. Spaulding and C. C. Sullivan.

ST. JOSEPH & SAVANNAH.—An officer writes that this company has projected a line from Savannah, Mo. to Fillmore, 11 miles. C. W. Campbell, chief engineer, St. Joseph, Mo.

ST. LOUIS, BROWNSVILLE & MEXICO.—See St. Louis & San Francisco.

ST. LOUIS & SAN FRANCISCO.—An extension of the branch of the St. Louis, Brownsville & Mexico, which now runs from Port O'Connor, Tex., west to Bloomington, 39 miles, is projected north to Victoria, about 15 miles. Connection is to be made at Victoria with the Southern Pacific.

This company and the Louisville & Nashville, will jointly build 120 miles of new line at an average cost of $35,000 a mile to complete connections over new joint routes, including a cut-off from Beaumont, Miss., to the Louisville & Nashville, just east of New Orleans, La. The Chicago & Eastern Illinois is to build an extension to Paducah, Ky., when the new double-track bridge over the Ohio river at that place is completed. This arrangement will add about 500 miles to the Frisco system. See an item under Traffic News regarding these new lines. F. G. Jonah, chief engineer construction, St. Louis, Mo.

SOUTHERN RAILWAY & NAVIGATION CO.—An officer writes that this company is now at work on on extension from Jeffris, La., to Vidalia, 8 miles. D. K. Jeffris, president and general manager, Pullman Bldg., Chicago, Ill.

SPOKANE & BRITISH COLUMBIA.—An officer writes that surveys have been made for an extension from Republic, Wash., southeast to Spokane, 140 miles. W. T. Beck, president, Republic.

TAMPA NORTHERN.—An officer writes that surveys are now being made for an extension from Brooksville, Fla., north to Dunnellon, 40 miles. M. F. Amorous, president and general manager, Tampa, Fla.

TIDEWATER & SOUTHERN.—An officer writes that nearly all of the grading work has been done and track has been laid on two miles between Stockton, Cal., and Turlock. There will be two steel bridges of 120 ft. each and two bridges of 150 ft. each; also a 4,000-ft. trestle. The company expects to find a traffic in general merchandise, dairy products and fruit. Carl Brueck, president, and J. H. Wallace, chief engineer, Stockton. (November 3, p. 932.)

WESTERN MARYLAND.—It is expected that work will be finished in December on the new line from Cumberland, Md., north to Connellsville, Pa., 87 miles, where connection is to be made with the Pittsburgh & Lake Erie. H. R. Pratt, chief engineer, Baltimore, Md.

WOODVILLE RAILROAD.—An officer writes that an extension is projected from Wakulla, Fla., south to Crawfordsville, 10 miles. Thomas M. Hall, president and general manager, Woodville, Fla.

## RAILWAY STRUCTURES.

CRAIGDELL, PA.—The Pennsylvania Railroad has given a contract to T. N. Sims & Co., Philadelphia, Pa., for constructing a small concrete arch, to replace a girder bridge over the hollow near Craigdell on the Conemaugh division. The cost of the work will be between $10,000 and $15,000.

EAST ST. LOUIS, ILL.—The Southern is preparing plans for an 18-stall roundhouse, a machine shop and a blacksmith shop to cost approximately $75,000.

EL PASO, TEX.—According to press reports the Texas & Pacific will put up a concrete and steel freight house in El Paso, to cost $75,000.

HAZELTON, B. C.—The Grand Trunk Pacific, it is said, will build a station at Hazelton.

KAMLOOPS, B. C.—Waddell & Harrington, engineers, Kansas City, Mo., will design and superintend the construction of ten new steel bridges for the Canadian Northern. The total cost of the structures will be about $1,000,000. Seven bridges will span the Thompson river, one the North Thompson river, and two will be over the Fraser river, between Cisco to Kamloops, B. C.

KIRKLAND, WASH.—The Northern Pacific will build a new station at Kirkland.

MCALESTER, OKLA.—The Missouri, Kansas & Texas is remodeling and enlarging its passenger station and is building offices for the American and United States express companies.

NEW HAVEN, CONN.—The New York, New Haven & Hartford will soon start work on a $50,000 machine shop near the roundhouse on the Quinpiac meadows, above Cedar Hill station, which is nearing completion. For the Connecticut Company the New Haven has started the construction of an addition to its Grand avenue power house, 32 ft. x 70 ft. It is to be of brick and reinforced concrete. This is to be used as a boiler and engine room and will cost about $25,000. (July 7, p. 65.)

PORTLAND, ORE.—The Southern Pacific has taken out a permit to build a new car repair shop at the foot of East 22d street, at a cost of $3,900, and plans are being made for a new passenger station on Water street to cost $5,000.

SACRAMENTO, CAL.—The Southern Pacific is building a double-deck bridge to carry double tracks, with a highway on the upper deck, over the Sacramento river, near Sacramento. The swing span is to be 400 ft. long and will weigh 3,150 tons. The American Bridge Co. has the contract for the steel work. The entire bridge will weigh 5,000 tons.

SEATTLE, WASH.—The Northern Pacific has given a contract to the Weymouth Construction Co., Seattle, for improvements and additions to its Pier No. 1, Seattle, to cost $125,000. (June 23, p. 1675.)

TACOMA, WASH.—The Oregon-Washington Railroad & Navigation Company has been granted permission to build an overhead crossing over Indian Stuck valley, near Tacoma.

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B. D. Voskresensky, the engineer who accompanied the Russian minister of ways of communication in his journey of inspection along the Amur Railway, has made a report on his experiences in connection with this railway. It is divided into the Western Amur, the Central Amur and the Eastern Amur. The route lies along a plateau, from 2,800 ft. to 3,500 ft. above sea level. At a height of 2,500 ft. permanently rozen ground has to be dealt with. Ignorance of the properties of permanently frozen ground was the cause of many difficulties in the construction. A striking example is shown in connection with the Tchitin workshops which showed fissures and gave the impression of having suffered from earthquake, notwithstanding the fact that the foundation of the walls had been laid very deep, in some places 14 ft. Experience has shown that on the contrary such foundations should be laid near the surface, in which case the building holds together well. The country through which the line is being laid is exceedingly picturesque, suggesting Switzerland. The work was accompanied by great difficulties. The workmen lived both summer and winter in tents, and it was only their enthusiasm that enabled them to overcome their privations. The necessaries of life, including tea and sugar, were frequently wanting, and the cost of living was exceedingly high for everybody. The ground along the line is very rocky and was very expensive to remove. Water was difficult to obtain, for the rivers became completely frozen on the Trans-Baikal line. In such circumstances wells were dug and water was conveyed in heated channels, but on the Amur Railway arrangements are much more simple and freezing is obviated by means of circulating water in pipes. At present the most difficult part of the road has been cut through and the Western Amur Railway should be finished in 1912. Along the whole region the population is increasing and villages are forming up notwithstanding a number of unfavorable circumstances.

# Railway Financial News.

Ashboro & Aberdeen.—A press despatch from Greensboro, N. C., says that the control of the Ashboro & Aberdeen has been sold to the Seaboard Air Line. The A. & A. runs from Aberdeen, N. C., to Mount Gilead.

Atlantic Coast Line.—The directors have declared a semi-annual dividend of 3½ per cent. on the common stock, thus placing the stock on a 7 per cent. annual basis as compared with a 6 per cent. annual rate paid heretofore. The Atlantic Coast Line is controlled by the Louisville & Nashville.

Atlantic Northern & Southern.—It is understood that the court has approved the purchase of this property by Colonel George Adams. The Atlantic Northern & Southern runs from Atlantic, Iowa, to Kimballton, and from Atlantic to Villiscalla, a total of 54 miles. (October 6, p. 692.)

Boston & Maine.—Negotiations for a new lease by the B. & M. of the Suncook Valley Railroad have failed to arrive at any satisfactory understanding. President Mellen, writing to a representative of the stockholders of the Suncook Valley, is quoted as saying in part: "One of the charges that I have found most hard to meet is that many of the present difficulties in which the Boston & Maine finds itself at the present time are the results of improvised leases. The responsibility for all existing leases lies with the former administrations, and it is the determination of those at present in charge that nothing of this nature may be laid at their door. The major portion of the mileage of the leased lines in New Hampshire is at the present time far from self-supporting. . . . It may become a necessity to reduce the rentals paid if not by the negotiations with the owners in last resort through the medium of the courts and a receivership. Nothing but the support given to the Boston & Maine in the present crisis in its affairs by the New York, New Haven & Hartford has thus far saved it from such a recourse. The Boston & Maine offered to exchange Concord & Montreal class 4 stock for Suncook Valley stock on the basis for one share of C. & M. for three shares of Suncook Valley. The Concord & Montreal pays 7 per cent. Under the lease that has now expired, the Suncook Valley stockholders were receiving 6 per cent. on their stock, which compares with 2⅓ cents which they would receive if they accepted the offer of the Boston & Maine.

Chesapeake & Ohio.—See Kanawha & Michigan; also Hocking Valley.

Cincinnati, New Orleans & Texas Pacific.—The directors have declared an extra dividend of 2½ per cent. on the common stock, and in addition a semi-annual dividend of 3 per cent. The annual rate was previously 5 per cent.

Concord & Montreal.—See Boston & Maine.

Delaware, Lackawanna & Western.—The stockholders of the Oswego & Syracuse, a subsidiary of the Delaware, Lackawanna & Western, are to vote December 6 on the question of making a mortgage to secure an issue of bonds which are to reimburse the D. L. & W. for advances to pay for maturing securities of the Oswego & Syracuse and for new improvements.

Hocking Valley.—The directors have declared a semi-annual dividend of 3 per cent. This places the stock on a 6 per cent. basis as compared with an annual rate of 4 per cent. paid since 1907. The Hocking Valley is controlled and the majority of its stock owned by the Chesapeake & Ohio.

Hudson & Manhattan.—This company, which operates the tubes under the Hudson river, has raised the fare from Jersey City to uptown New York from five cents to seven cents, as mentioned elsewhere. In connection with this, the company has made a statement which says in part: "On the business thus far developed, and with a uniform five-cent fare, the company has not earned interest on its bonds, taxes and other fixed charges. The burden of taxation alone (notwithstanding the particularly fair attitude of the New Jersey authorities) is enormous. For the fiscal year ended June 30, 1911, taxes aggregated $114,589. For the present fiscal year, on the basis of assessments already made they will be increased to approximately $478,282. If the company was exempt from taxation (like the New York subway) it could continue to carry passengers for a uniform five-cent fare."

Kanawha & Michigan.—The directors have declared a 2½ per cent. dividend, payable December 30. The only previous dividend was the 4 per cent. declared last June. The Kanawha & Michigan is controlled by the Chesapeake & Ohio and the Lake Shore & Michigan Southern jointly.

Louisville & Nashville.—See Atlantic Coast Line.

New York Central & Hudson River.—The directors have authorized an issue of $15,000,000 joint N. Y. C. lines equipment trust 4½ per cent. certificates.

Norfolk Southern.—The supreme court of Virginia has affirmed the dismissal by the circuit court of the suit brought by the Vandyke-Zell syndicate to invalidate the sale of the old Norfolk & Southern to the present Norfolk Southern Company. This apparently is a final settlement of the point that has been in litigation ever since the foreclosure sale.

Oregon-Washington Railroad & Navigation Co.—The *Wall Street Journal* says that it is understood that Kuhn, Loeb & Co., New York, have bought from the Union Pacific and resold $6,500,000 50-year 4 per cent. refunding bonds of the Oregon-Washington Railroad & Navigation Co.

Oswego & Syracuse.—See Delaware, Lackawanna & Western.

Pascagoula Northern.—A press despatch from Mobile, Ala., says that the St. Louis & San Francisco has bought the Pascagoula Northern. This road runs from Evanston, Miss., to Pascagoula, 42 miles.

St. Louis & San Francisco.—J. W. Dixon, counsel, and T. D. Heed, assistant secretary, were elected temporary directors, succeeding Frank Trumbull and C. R. Gray, resigned.

Savannah, Augusta & Northern.—See Savannah & Statesboro.

Savannah & Statesboro.—This company is to lease and take over the operation of the Savannah, Augusta & Northern. The Savannah & Statesboro runs from Savannah, Ga., to Statesboro, 33 miles, and the Savannah, Augusta & Northern runs from Statesboro, Ga., to Steven's crossing, 39 miles. (Feb. 17, p. 335.)

Seaboard Air Line.—Arrangements have been made to sell the $6,785,000 Seaboard Air Line Railway adjustment bonds held by the Seaboard Company. With the proceeds of the sale of adjustment bonds and other cash assets which the Seaboard Company holds, it could, if it desired, retire the $6,360,600 first preferred stock at par. The Seaboard Company is the holding company for the Seaboard Air Line Railway. It was organized in 1905 and owns 83 per cent. of the stock of the railway company, the adjustment bonds heretofore referred to, and $900,000 5 per cent. notes of the railway. The Seaboard Company has no debt and has outstanding, beside the preferred stock referred to, $28,543,300 common stock and $15,993,600 second preferred stock.

This company and the Seaboard & Roanoke Railroad have filed in Virginia a mortage to secure $2,500,000 first mortgage 5 per cent. bonds.

Suncook Valley Railroad.—See Boston & Maine.

Vandalia.—This company has passed the quarterly dividend of 1 per cent. usually paid in November, and President Wood has issued a circular in which he explains that last year the dividend had not been earned in that year and was paid in part from surplus, and that notwithstanding the reduction of the rate from 5 per cent. to 4 per cent., which reduction was made in May, the dividend could not be continued except by making further payments from surplus. Pay rolls have increased over $400,000 and operating expenses have increased $135,000 as the result of compliance with regulations of national and state commissions.

Western Maryland.—This company has applied to the New York Stock Exchange to list $4,115,000 additional first mortgage bonds.